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ORIGINAL ARTICLES.

THE WORK-CURE IN SURGICAL TUBERCULOSIS.

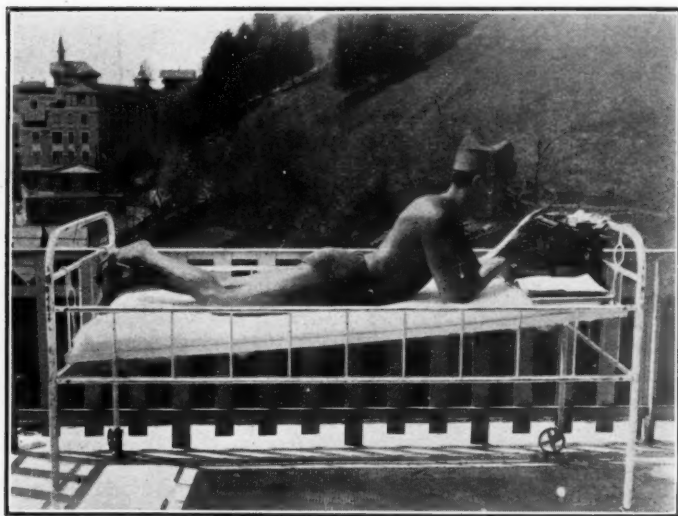
By A. ROLLIER,

M.D.

It was in England that the Work-Cure was first applied to patients suffering from pulmonary tuberculosis, and foremost among the pioneers was Dr. Marcus Paterson, who, at Frimley, prescribed graduated work in the form of gardening and agricultural pursuits. Today perhaps the most striking example of this method may be seen in the wonderful achievement of Dr. P. C. Varrier-Jones at Papworth Tuberculosis Settlement. In the following article I have sought to describe how we, in our turn, at Leysin have applied the Work-Cure to bedridden patients suffering from surgical tuberculosis.

When faced with the problem of treating a chronic disease which disables the unfortunate sufferer for an indefinite period, nothing should be overlooked which can contribute to recovery. It is a common mistake to regard disease as a disturbance of function in one or another organ, and to view morbid processes as something of purely local importance which comes and goes, leaving the body as a whole more or less untouched. Modern medical thought now tends to stress more and more the interdependence of the different component parts of the organism; and the word "diathesis," which had been abandoned during the era of bacteriological enthusiasm, has once more, and justly so, become popular. It is now recognized that the soil is often just as important, if not more so, than the pathogenic seed; and also that the condition of the soil is determined by many factors, among which environment and nervous influences are by no means the least important. By environment is meant in this connection all those external conditions—climatic, nutritional, and those depending upon

contact with other human beings—which go to make up the warp and woof of everyday life. The importance of nervous influences need not here be stressed. Every clinician of experience has practised suggestion long before it became popular, and Coué's so-called discovery may be considered as old as Hippocrates. The aim of rational therapeutics must be then to re-establish as far as possible the equilibrium which has been disturbed by disease. This can be effected by the Work-Cure associated with the application of treatment by the sun's rays. These latter act, not only by stimulating all the functions of the organism, but influence also the morale of the patient, producing in



A TUBERCULOUS SPINAL PATIENT TYPEWRITING IN THE VENTRAL POSITION.

him or her a sense of well-being which aids in re-establishing a moral equilibrium.

The cases of surgical tuberculosis which come to the mountains present for the most part a bad general condition; they have usually been weakened by long periods of residence in the hospitals below, or by repeated operations. Not infrequently these patients have been discouraged by the failure of former attempts at treatment and have lost all faith in the possibility of cure, and worst of all they have ceased to have a will to be cured. One must always remember to treat the human spirit as well as the physical body, and heliotherapy used first alone and then in association with a systematic Work-Cure

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helps in the most wonderful way. Very few patients are insensible in winter to brilliant sunshine reflected from the snow; it gives them all that profound and inward satisfaction which comes from the renewal of activity in their various faculties: an expansion takes place as it were in their whole being. This spiritual rebirth is oftentimes very striking. "Under the influence of air and sun-baths," writes a Belgian doctor, "one is the witness of real resurrection: the birth or rebirth to life worth living, to perfect intellectual and moral equilibrium, which



CASES OF SURGICAL TUBERCULOSIS AT WORK IN THE OPEN AT ONE OF THE POPULAR CLINICS.

changes disabused and disenchanted beings into lovers of all that is living."

For the conscientious medical adviser occupation-therapy provides a valuable auxiliary, for it simplifies for him the psychotherapeutic side of his work, which is so delicate a department, in his endeavour to secure appropriate treatment in chronic disease.

But even in the mountains the sun does not always shine, and heliotherapy alone is not sufficient to maintain the morale of bedridden patients. One must use such auxiliaries as are available; this is why, from the very beginning of our practice at Leysin, we have emphasized the value of the Work-Cure, since it can be carried on in all weathers. The Work-Cure, indeed, has proved such a remarkable therapeutic factor that I feel it must take its place alongside of heliotherapy itself.

It is common knowledge that work is one of the essential conditions of a normal life. This natural social law cannot be neglected

with impunity, for it is of divine origin. "Six days shalt thou work," said the Creator, "and do all that thou hast to do." Modern medicine has been guilty of a grave error in condemning to prolonged and almost complete inactivity those suffering from chronic disease. This is particularly true in regard to surgical tuberculosis, owing doubtless to the old belief that the lesions containing Koch's bacillus could be completely removed with the knife, like a tumour or any other purely local trouble. This conception led to the adoption of the policy of radical operation, too often repeated. Mutilation resulted, which, followed by



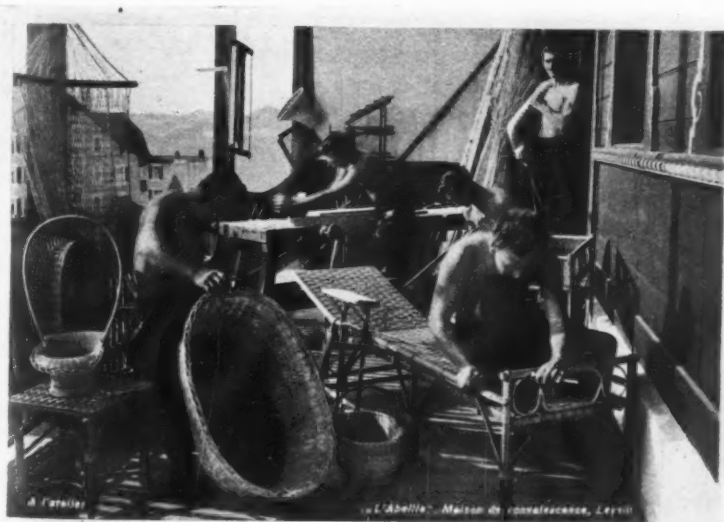
TUBERCULOUS PATIENTS UNDERGOING HELIOTHERAPY AND OCCUPATION-THERAPY ON ONE OF THE OPEN-AIR BALCONIES AT A POPULAR CLINIC AT LEYSIN.

prolonged hospital treatment, produced bad functional results, with almost invariable physical and mental retrogression. Then came the apparent triumph of the plaster cast, enclosing and immobilizing the diseased part. This is still regarded by some as an unassailable dogma. By imprisoning limbs and often the whole trunk in a veritable suit of armour, the muscles and tissues becomes atrophied, and the articulations ankylosed. This excessive immobilization, combined with prolonged inaction, produces in the patient both physical and mental torpor, which gradually annihilates organic resistance and the natural tendency to recovery.

General heliotherapy, as we have practised it since 1903 at Leysin, has already meant great improvement for the unfortunate subjects of



A CASE OF ADENITIS AND A CASE OF POTT'S DISEASE RESTING IN THE VENTRAL POSITION AND MAKING PAINTED WOODEN TOYS.



C

CONVALESCENT MEN ENGAGED IN BASKET-WORK AND WICKER CHAIR MAKING.

surgical tuberculosis. In all its forms, this is primarily a general disease whatever the seat of its local manifestation. We have tried to build up the organism weakened by tuberculous disease by stimulating the patient's natural defences and its vitality, both physical and mental. Abandoning all mutilating operations and occlusive plaster cases, we place the whole body in immediate contact with the sun's rays and mountain air—two invaluable aids to healing. Heliotherapy, practised with a correct technique, exercises a tonic influence on weakened organisms, and has a clearly reconstructive effect on the tissues, muscles, ligaments, and bony framework. The tuberculous subject



D

THE FIRST OFFICIAL PATROL OF BOY SCOUTS UNDERGOING OCCUPATION-THERAPY AND ENJOYING MUSICAL RECREATIONS.

offers no exception to the general law that physical activity declines and collapses without regular occupation. When the law of work is systematically violated, normal physiological activity deteriorates just as surely in the case of a tuberculous patient as in the healthy individual. As a temporary help the study of foreign languages is excellent, and so is reading—if the patient's will is strong enough to indulge only in "healthy" reading. By themselves, however, neither reading nor study seems to be of much value physiologically or psychologically. Manual work offers what is needed; without it the patient plays a mere passive rôle, and easily becomes mentally slack and even lazy, and all too commonly his first enthusiasm to do well soon flags.



A TUBERCULOUS GIRL WITH POTT'S DISEASE OF THE SPINE WORKING AT EMBROIDERY, ETC., WHILE IN THE VENTRAL POSITION.



BED PATIENTS IMPROVING UNDER OCCUPATION-THERAPY ON A BALCONY OF ONE OF THE POPULAR CLINICS.

Patients, on the other hand, who pursue a methodical course of manual work adapted to their individual tastes soon become conscious of a progressive recovery of strength, accompanied by the pleasant sensation inseparable from the carrying out of regular organic functioning and the adaptation of the human mechanism to a daily task.

Our first step, therefore, has been to replace plaster cases with simple forms of orthopaedic apparatus which, while imposing relative immobility on the diseased tuberculous articulations, leave the other structures complete liberty of movement. Further, we have aimed at the development of movement in the healthy joints by graduated and progressive exercises. By means of carefully devised and strictly ordered articular and muscular gymnastics a more active circulation is established, which benefits the general metabolism and secures a reliable organic defence. It soon became evident that exercise of the most rational and physiological nature was to be found in manual work, which has the additional advantage of favourably influencing the morale of the patient.

Our first application of these principles to our patients was the establishment, in 1909, of the Work Colony at Leysin, in collaboration with Pasteur Hoffet. The object was to provide for patients well on the way to complete cure, light work such as basket-weaving, carpentry and the like, which would at the same time be sufficiently remunerative to permit of their remaining at Leysin during convalescence without further expense to themselves. Whenever possible this work was carried out under healthy conditions on the balconies of the clinics. The money earned by the patients covered, in part at any rate, the cost of their maintenance; they themselves were rescued from that depressing feeling of uselessness, and, whilst completing their cure, gradually resumed a life of normal activity.

Our next step was the systematic introduction of the Work-Cure into the military clinics established at Leysin for bedridden surgical tuberculous cases. The results were so conclusively successful that we decided to extend it throughout all the popular clinics for surgical patients. At first sight it might seem dangerous to put bedridden patients suffering from surgical tuberculosis on to a régime of manual work. Current orthopaedic thought is still so hypnotized by the supposed necessity of absolute immobility of the diseased region, that the idea of a patient suffering from tuberculosis of the spine being allowed to engage in typewriting may seem somewhat startling. The ventral position from this point of view is, apart from its many other advantages, an unmixed blessing. Once the patient has learnt to prop himself up on chest and elbows, the hands and forearms are free and can be employed for all kinds of normal work. In the same way, all the other articulations can be so dealt with as to leave the maximum of freedom



BOOKBINDING AS A DESIRABLE FORM OF OCCUPATION-THERAPY.



MEN TUBERCULOUS PATIENTS AT WORK ON AN OPEN-AIR BALCONY IN ONE OF THE POPULAR CLINICS AT LEVSIN.
Note the pigmented condition of the skin in these cases.

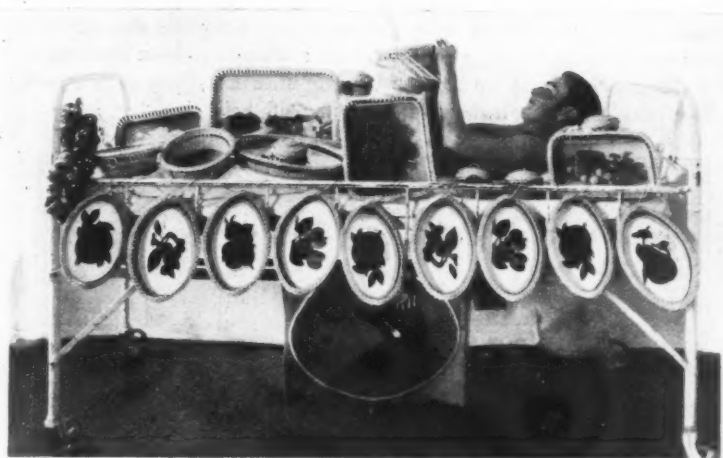
for the rest of the body, while preserving, by the aid of simple splints and weight and pulley extensions, the necessary degree of immobility.

In tuberculosis of the hip-joint, the coxo-femoral articulation being fixed by continued extension, a special apparatus enables the patient to work on his back without the least movement of the hip. As regards the knee and foot, there is no difficulty in combining immobilization of the joints and exposure to the sun with manual work. Even if the disease has attacked the upper limbs, it is often possible, if the wrists and hands are free, to provide some simple task for the sufferer. For each case, according to the situation of the disease, there is some form of work which is peculiarly suitable.

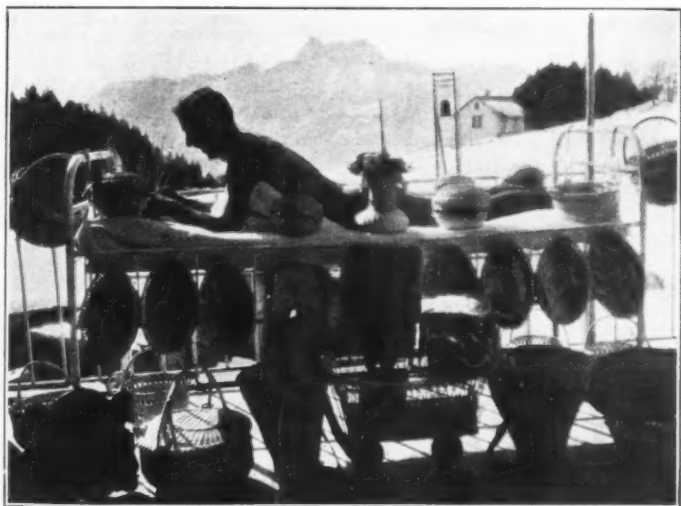
In cases with tuberculous trouble involving knee or foot, such crafts as wood-carving, cardboard box-making, basket-weaving, typing, and even watchmaking, may easily be undertaken by the patient, while for those with tuberculous disease involving the hip-joint, and even cases of tuberculous peritonitis necessitating immobilization and rest on the back, lace and fillet-work, crochet, and painting on wood and porcelain, will oftentimes be found suitable occupations.

Our first experiments in the Work-Cure, carefully individualized and under medical control, gave the most encouraging results. When the patient shakes off that apathy into which he so readily sinks and starts working, the necessary collaboration of brain and muscle provides him with the healthiest of distractions; his whole mental attitude changes, and as a natural consequence his physical condition improves. The patient who works soon ceases to suffer from a sense of uselessness, and through the beneficial influence of regular work regains a conviction of his own worth. With the improvement of morale his soul expands and becomes, as it were, infused with new light. Thus is realized that harmony of body and spirit which is a true reflection of the Creator's thought. Anyone who has seen patients on our Work-Cure balconies must have been struck by the joy that animates them and the quiet content manifest on all faces, and will realize what a marvellous stimulus, both physical and moral, is to be found in manual work. No unprejudiced observer can watch these cases without being impressed by the wonderful results obtained by a strictly regulated Sun-Cure when coupled with an equally strictly regulated Work-Cure, carefully adapted to the individual needs of each patient.

Results have been and still are most satisfactory, and we are now contemplating the enlargement of our workshops. In fact, we are building an international factory-clinic for indigent patients where, although under treatment, they will have an opportunity of working for their living. The work will be organized on a larger and more important scale than has been possible hitherto. Besides those handicrafts which have been carried on up to the present, work will be introduced of



A BEDFAST PATIENT ENGAGED IN BASKET-MAKING.



A TUBERCULOUS SPINAL CASE WORKING WHILE IN THE VENTRAL POSITION.

direct use in trade, such as watchmaking and other mechanical industries. Further, a special floor will be reserved for the conduct of a commercial school, where youths whose studies have been interrupted by disease can make up for the opportunities lost through sickness. The establishment of the factory-clinic will help to solve many of



A CASE OF HIP-DISEASE ENGAGED IN BASKET-MAKING.

those problems which are inseparable from the treatment of indigent patients suffering from surgical tuberculosis. If it succeeds, as we believe it will, the last patients to come to us will probably be the first to recover, and their cure will be the more lasting in that it will be the result of that very factor—work—which the well-to-do only too often misunderstand and too frequently even despise.

COLONIES FOR THE TUBERCULOUS.

By JAMES JOHNSTONE,

M.B., CH.B., D.P.H.,

Medical Superintendent of the Hairmyres Tuberculosis Colony, East Kilbride,
County of Lanark.

COLONIES for the tuberculous have been much under discussion within recent years, and different opinions have been expressed by various writers, most of whom have obviously had little or no experience regarding settlements for consumptive and other tuberculous cases. If a colony scheme is to be successful, several factors must be care-



INDUSTRIAL WORKSHOPS: BASKET-MAKING DEPARTMENT.

Patients at work. A variety of articles which they have made are shown in the workshop.

fully considered. The question of the occupation of each patient before entering the colony is of the utmost importance. Are the patients drawn from rural or industrial areas? If they come from an industrial area, as most of them do, then, as a rule, they are skilled or semi-skilled men, and farm work or the like will not appeal to them. Neglect as to this point originally reacted against colonies, some of which were perhaps rather unfortunately called "Farm Colonies." At

Hairmyres, where the majority of our Lanark patients are miners, one had to give this factor very serious consideration.

The outdoor occupations available at Hairmyres are market gardening, forestry, poultry farming, and pig rearing. These have been selected as suitable occupations for tuberculous subjects. Work in these departments comes mainly under the heading of occupational therapy, although a certain number of patients have been successful in earning a livelihood at these occupations. Critics of colony schemes are apt to judge results by the number of trainees who have been successfully placed, forgetting that this is not the main object of occupational therapy.

Another factor, which, in my opinion, is the main one in ensuring the success of a colony scheme, depends, as one can readily understand, on the suitability of the patient viewed both from the physical and mental point of view. It is a waste of time and money to send a case of active tuberculosis to a colony, and this is what happens in a certain number of cases. To overcome this difficulty, all patients should receive a period of sanatorium treatment before being passed on to a colony. It is agreed by all authorities that cases of active tuberculosis require rest, and this can only be properly obtained in such an institution as a sanatorium. On the other hand, the period of sanatorium treatment should not be prolonged beyond the stage of rest, or the patient is encouraged to indulge in "healthy loafing." Patients in a sanatorium can often be seen loafing around killing time and getting into mischief because they have nothing to do; such is a state which it is easier to get into than out of. What could be better for these cases than graduated labour at a colony, where the patient has something interesting to do, and feels that he is of some use? Reference may here be made to an interesting experience we had a few months ago, when, owing to the illness of one of the instructors, a certain department was temporarily closed, with the consequence that the patients working there were left idle. A deputation approached me one morning and implored that they should be given something to do, as they were tired of doing nothing. In a colony where all are doing some work, a man who is doing nothing feels out of it.

The hours of labour must vary according to the fitness of the patient, as well as the nature of his occupation. The first stage is generally light work, such as tidying up the wards, gathering papers—certainly a very necessary operation after visiting day. As the patient improves he is promoted to one of the outdoor occupations as above mentioned. At Hairmyres, where we have two large pavilions for adult males, the best cases and those who can work longest are kept in one pavilion. This is an incentive to the patient, who realizes that transfer to this pavilion means improvement in his condition. In

addition to the ordinary daily medical visits, each patient's condition is gone into fully once a week, and this ensures that the patient is improving and that the graduated labour is not being pushed too far.

It is obvious that there must be the closest co-ordination between the colony and the sanatorium, as the latter is not only a stepping-stone to the colony, but provides also a place to which unsuitable cases may be retransferred if their condition does not improve while undergoing colony treatment.

So far the occupations mentioned have been more of the nature of occupational therapy. Within recent years there has been a demand



INDUSTRIAL WORKSHOPS: CABINET-MAKING DEPARTMENT.

Patients who are trainees are receiving instruction in wood-turning and planing.

for training in occupations which have promise of providing a permanent means of livelihood—in other words, vocational training. This desire was, no doubt, stimulated by the establishment of vocational training centres by the Ministry of Pensions for tuberculous ex-service men. In choosing occupations suitable for vocational training, several factors have to be considered. Is the scheme to be for a permanent village settlement, where the trainee will remain for the rest of his days? Is it only to be a training centre or colony through which the trainee will pass after a period of one or two years' residence, and

go into the open market to find employment? It must be admitted that the scheme of permanent settlement offers the easier solution. However, we will endeavour to show that the colony scheme, although bristling with difficulties, is capable of being made a success.

In discussing details regarding occupations, it is obvious that printing is a very suitable form for a settlement where the work can be carried out under excellent hygienic conditions, and from the commercial point of view it can generally be made a financial success. One could not consider this at all a suitable occupation for vocational



INDUSTRIAL WORKSHOPS: BOOT-REPAIRING DEPARTMENT.

Most of the work in this department is done by hand, the only mechanical appliance being a finishing-machine.

training in a colony. It is a well-known fact that an ordinary printing factory is not a suitable place for a tuberculous man. Owing to trades union restrictions, it would be practically impossible for a trainee to get a job outside the colony. Each occupation must be considered entirely from the trainee's point of view, and the commercial aspect, as far as it relates to the colony, must be considered a secondary matter. The occupation encouraged should be one that does not require much capital to set up the trainee in business for himself. As each trainee obviously has very little means, it would be fatal to train in an occupation that requires expensive machinery, such, for example,

as printing. The occupation selected should be essentially healthy; it is a mistake to attempt to train a patient in a new occupation if he is already skilled in one that is of a healthy nature. A man is naturally more proficient in a trade at which he has worked for many years. Anyone in this category should receive a course of occupational therapy only.

At Hairmyres Colony we are not troubled so much with the problem of selection of an occupation, as the great majority of our patients are coal miners: one naturally desires that they should take



INDUSTRIAL WORKSHOPS: MOTOR DEPARTMENT.

The trainees are seen doing general repairs to the motors.

up healthier work. Taking all points into consideration, we finally decided to give vocational training in the following occupations: Motor driving and repairing, cabinet making and rural carpentry, basket making, and boot repairing. Owing to the long period of residence required for training, it was agreed to pay each trainee 5s. a week after a probationary period of one month. This is certainly not an excessive remuneration. In this connection it is interesting to record that the one and only occasion in which we had any trouble with a trades union was when a representative visited the colony and pointed out that the wage was far too small for the work done. We

indicated to him that the trainee was really receiving £3 8s. per week, 5s. a week in cash and £3 3s. being the cost of his maintenance at the colony. Since then we have had no further trouble.

It will be admitted that motor driving and repairing seem to fulfil most of the requirements for a hygienic vocation. They are healthy, open-air occupations, only requiring a short period of training, and offering a good prospect of permanent employment. So far they have been the most popular forms of training at Hairmyres. The course takes a year, and to ensure that the trainee will not leave the colony until he is proficient, he is sent up for the driving certificate of the Royal Scottish Automobile Club. This ensures proficiency in traffic driving, which the trainee learns on one of our own lorries.

Training in cabinet making is a longer course, approximately one and half years; and our object is to train the patient to make the finer and smaller articles which cannot be duplicated by machinery. We seek also to train him so that he shall be able to prepare and veneer furniture. To ensure a certain standard of proficiency, the trainees are entered for the examination in cabinet making of the City and Guilds of London Institute.

Basket making in Scotland, apart from work in the blind institutions, does not seem to be carried out to any great extent, the result being that any special articles must be procured from England—for example, pigeon baskets—consequently this occupation seems to offer a good prospect of employment. The trainees in this department also sit for the examination in basket making of the City and Guilds of London Institute.

Boot repairing is essentially an occupation that does not require much capital, but care should be taken to see that the trainee is employed under healthy surroundings. Boot repairing offers an excellent prospect of permanent employment.

To make a scheme of vocational training a success for tuberculous men, it is essential that the trainee should not be lost sight of after his training has been completed. The best way to attain this is by means of an after-care committee, which would guide and advise each individual. It might be possible to consider the question of a grant or loan from the local authority to start a man in business. One must remember that we are dealing with a tuberculous man, and psychologically a tuberculous patient is difficult to manage and requires careful handling. The county of Lanark had a scheme for the conduct of local workshops scattered over the county—each man, on completion of his training at Hairmyres, was to be transferred to the workshop nearest his own home. This scheme, however, has been held up owing to the present financial stringency.

THE "HÄLSAN" INSTITUTE: AN ANTI-TUBERCULOSIS EXPERIMENT, ON THE LINES OF SOCIAL HYGIENE, IN THE FAR NORTH OF SWEDEN.¹

By GUSTAV NEANDER,

M.D.,

Secretary General of the Swedish National Association against Tuberculosis.

THE following is a brief account of an intensive anti-tuberculosis campaign initiated by the Swedish National Association against tuberculosis in 1908, in a district in the far north of Sweden which is a veritable hot-bed of consumption. This paper deals with the results as shown by an examination made two years ago. I have also included certain considerations regarding an investigation into the dissemination of tuberculosis in Sweden.

The Swedish National Association against Tuberculosis, shortly after its foundation in February, 1904, resolved to organize an experiment, on the lines of social hygiene, with a view to ascertaining the most effective means for the counteraction of tuberculosis. In accordance with a plan drawn up by the then Secretary of the Association, Dr. B. Buhre, it was decided to carry on a vigorous anti-tuberculosis campaign in a carefully selected area. This was to be a poor parish of medium size, situated in a remote district with bad communications, and inhabited by a comparatively stationary population, afflicted extensively with tuberculosis. After much searching, a suitable area was found in the four villages of Antnäs, Ersnäs, Alvik, and Långnäs, situated in the large parochial district of Neder-Luleå in the county of Norrbotten. This region had long been known as a part of Sweden where consumption was specially prevalent. The accuracy of this view was confirmed by investigations made on the spot. The villages, which are adjacent to one another, are situated close to the coast and just south of the town of Luleå at approximately 65° 33' N. lat. This strip of coast is in parts swampy, and is exposed to severe frosts and fogs. Here the winter is long and dark,² the spring bleak and cold, the autumn windy and rainy: the climate, in short, is severe and trying to the health of human beings. The villages, which have a total population of some 2,000 souls, of almost pure Swedish race, are

¹ Dr. G. Neander's suggestive article is based on his recently issued volume "The 'Hälsan' Institute in Norrbotten," referred to on p. 81 in the last issue of this Journal.—EDITOR "B.J.T."

² At Christmas the sun is above the horizon for three hours only.

inhabited chiefly by small farmers. These people just manage to make a bare living. Noteworthy features are the large number of small children, and the extremely heavy burden of work that falls on the women.

When the experiment was started, the hygienic conditions in the dwellings, particularly in regard to ventilation, were most defective. During the whole of the long winter the double windows were nailed down so as not to admit a single breath of air. Even where the houses were large and roomy, the family, however numerous, used to sleep in a single room—the kitchen. Many families still retained the old-fashioned “cupboard bed,” being a large cupboard fixed to the wall



FIG. 1.—THE “HALSAN” INSTITUTE, NORRBOTTEN, SWEDEN.

This house provided the headquarters of the tuberculosis service described in the accompanying article. It contained quarters for the medical adviser and assistants, and was equipped with beds, etc., for consumptives, and provided also a home for healthy children.

with berths in two storeys. The inmates of these beds actually passed the night in a tightly closed cupboard! A considerable number of healthy persons shared a bed with consumptives. The food was plain and monotonous, consisting chiefly of milk dishes and fish. Coffee was greatly abused. Personal hygiene was in many respects deplorable: for example, most of the people did not take a single bath throughout the winter. The care of the children, more especially of infants, left much to be desired. The babies received food ill-adapted to their age, were swathed in a plethora of clothing, and anxiously guarded from fresh air.

Such was the milieu in which the National Association started its

work in March, 1906. A house purchased at Antnäs was turned into a small cottage hospital, combined with a children's home and a doctor's residence. This little establishment, which was named the "Hälsan" Institute, was placed in charge of a tuberculosis officer, assisted by two nurses. The first tuberculosis officer, Dr. E. Danielsson, retired after a year's service and was replaced by the present writer, who, after a temporary arrangement, held a regular appointment continuously from March, 1908, to the end of 1913. A proclamation had previously been issued to the inhabitants, in which they were urged to give their earnest and whole-hearted co-operation



FIG. 2.—THE INTERIOR OF A TYPICAL FARMSTEAD IN THE ANTNÄS DISTRICT OF SWEDEN.

The illustration shows the cupboard bed in which many consumptive cases were accustomed to rest and sleep and ultimately died.

to the enterprise. Considerable opposition was encountered at first, especially in two of the villages, but it gradually subsided.

In March, 1908, I made a wholesale examination of the population of the villages, which was attended by about 90 per cent. of the inhabitants. It showed that 12 per cent. of the population examined (199 cases) were suffering from undoubted tuberculosis of the lungs. Approximately one-third of the cases were diagnosed as active. In the course of the examination one or more cases of tuberculosis were found in 156 families—that is, in 44 per cent. of the total number. More than half the number of persons examined reported deaths from

consumption as having occurred among their near relatives. The work which was being carried out in the experimental area aroused great interest in the surrounding district, and, at the request of the inhabitants, a similar general examination was made in three additional villages. A simultaneous investigation into the incidence of bovine tuberculosis showed that the cattle in this area—despite close association with many human carriers of tuberculous matter—were entirely exempt from tuberculosis.

The work performed by the officer and nurses was of a twofold character: firstly, medical attendance and nursing; secondly, public enlightenment and other prophylactic measures. Efforts were concentrated on the protection of children exposed to grave risks of infection from consumptive members of the family. Usually the first step taken was to endeavour to induce the carrier of the infection to remove to the Institute for free sanatorium treatment. If this offer was refused—as often happened, especially at the outset—the next step was to try and persuade the parents to send their children to “Hälsan,” where they would be boarded free of charge. The parents, however, usually refused.¹ The only expedient then left was nursing in the patient's own home under the strict supervision of doctor and nurses. The family were induced to give the consumptive a separate room, and received reiterated advice, warnings, and instructions.

The enlightenment of the people was carried on chiefly in a personal way. The officer and nurses went their rounds from home to home, talking to the people, imparting advice, and endeavouring to effect various hygienic improvements. A vigorous campaign was conducted in particular against the popular prevailing cupboard beds. In addition, lectures were given on prophylaxis, and printed matter distributed. The habit of taking regular baths was effectually encouraged by the provision of free vapour-baths at the Institute. In the kitchen department instruction in cooking was provided free of charge to the young women of the district. The introduction of reforms in hygiene was by no means an easy task, and met with a great deal of opposition, especially on the part of old people. But the outcome was a gradual improvement in the hygienic conditions.

At the end of 1926, eighteen years after the preliminary examination, the writer again made a wholesale inspection of the population of the experimental area. The results were striking. Whereas in 1908 undoubted pulmonary tuberculosis was found in 12 per cent. of the entire population, the figure had now been reduced to 8 per cent. Thus a decrease of no less than 33 *per cent.* in the incidence of pulmonary tuberculosis. In both examinations about one-third of the

¹ During the experimental period twenty-two children in all were boarded at the Institute.

cases diagnosed were found to be active. How the *mortality* compared with the morbidity is shown in the subjoined table:

MORTALITY FROM TUBERCULOSIS.

	1911-1915, ¹	1921-1925.	Decrease.
	Per Cent.	Per Cent.	Per Cent.
In Sweden	1'94	1'46	25
In the county of Norrbotten ...	3'29	2'93	11
In the district of Neder-Luleå ...	3'99	3'97	0'5
In the experimental area ...	8'3	6'0	28

It will be observed that, whereas in the surrounding parochial district the mortality was almost stationary, the experimental area shows a decrease of no less than 28 per cent. Thus, to sum up, from 1908 to 1926 a decrease in the morbidity of 33 per cent., and from 1911-1915 to 1921-1925 a decrease in the mortality of 28 per cent. There was, moreover, a marked diminution in the number of deaths from tuberculous meningitis, and in the frequency of cases with swollen cervical lymph-glands. In both examinations the proportion between the number of deaths and *active* cases of consumption was found to be about 1:5. My investigations brought to light many interesting cases, indicating that members of families where the occurrence of tuberculosis can be traced back to several generations are more immune than members of families which had previously been exempt from the disease.

Our experiments and associated investigations arouse many points of general interest which deserve the consideration of tuberculosis workers in many lands. The mortality from tuberculosis in the county of Norrbotten is at the present time very great, being about twice as high as the average for Sweden at large. What can be the reason? The unfavourable climatic conditions, the intermixture of races, and such obvious matters as unsanitary habits of life are presumably contributing factors, but they are not exhaustive explanations. I have made an investigation into this question,² and have arrived at the following conclusions:

In the course of the first thirty years of the nineteenth century, tuberculosis appears to have spread from the capital of Sweden and other thickly-populated centres in ever-widening circles over the entire south and centre of Sweden, with a continuous trend northward. Some thirty years later we find a constantly *diminishing* mortality from

¹ Exact mortality returns for the rural districts before 1911 are not available.

² Based on figures compiled by the statistician, Gustav Sundbärg, for the period 1780-1830, and on mortality returns for subsequent periods.

tuberculosis in Stockholm and other towns in central Sweden. In the towns of Norrland—the upper part of Sweden—we note a similar decrease some ten or twenty years later. During the fifteen years' period from 1911 to 1925, we observe that the mortality from tubercu-

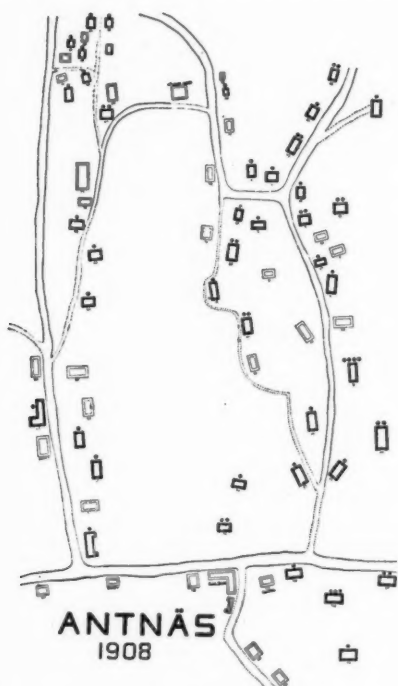


FIG. 3.—DIAGRAM INDICATING THE DISTRIBUTION OF CASES OF PULMONARY TUBERCULOSIS AT ANTNÄS IN 1908.

The rectangular frames represent the households in the village. The black frames indicate the existence of tuberculosis, the dots showing the number of cases in the several households.

losis in Sweden as a whole has diminished by 25 per cent., that of the county of Norrbotten by 11 per cent., as indicated in the above table. The most marked decrease is to be found in those parts of Sweden which a century before had shown the highest mortality. On the other hand, the least decrease and the highest mortality is found in those counties of Norrland which a hundred years back were almost exempt from the disease.

The apparently spontaneous regression of tuberculosis from certain parts of the country is thus evidently due to some kind of capacity

gradually acquired by the human organism for defending itself against tuberculosis. This capacity may be designated by the term *biological defence*. The opportunities for acquiring it increase in proportion to the density of the population; it is gained most rapidly in towns and urban communities, more slowly in rural areas in general, and most slowly in remotely situated parts of the country. The provision which Nature thus seems to make for the gradual elimination of the disease must, however, be supported by the co-operation of man—that is, by improved hygiene and other measures tending to create a milieu unfavourable to tuberculosis. These may be summed up in the term *cultural defence*.

Thus the real explanation of the present high frequency of tuberculosis in the county of Norrbotten is that the disease has there encountered a population which has not yet had time to acquire biological defence, and is in many respects sadly lacking in cultural defence. Now is it conceivable that biological and cultural defence solely would have sufficed without more ado to reduce the frequency of tuberculosis to its present level—in other words, is one justified in putting the question, Does the combating of tuberculosis involve a waste of time, energy, and money? The striking results of the Antnäs experiment, I think, enable us to give a conclusive reply to this question. Some twenty years after the commencement of an intensive anti-tuberculosis campaign we find that the morbidity and mortality have diminished by no less than 33 and 28 per cent. respectively. In the surrounding district the mortality from tuberculosis showed no diminution, and, indeed, in some parts probably an increase. This proves the value of direct measures against tuberculosis at an early stage of the progress of the disease. Their function is to *accelerate* its regression, especially by stimulating those factors which I have designated "cultural defence."

THE TREATMENT OF PULMONARY TUBERCULOSIS WITH A RESIDUAL ANTIGEN:

METHOD OF PREPARATION AND CLINICAL RESULTS OBTAINED.

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THE treatment of pulmonary tuberculosis cannot be described as successful, and the principal remedy appears to consist of fresh air and hope. Sanatorium treatment improves the patient's condition as long as he stays in the institution, but does not in the majority of cases prevent him from relapsing immediately he returns to his normal environment. It is obvious that, whilst good food increases his weight and fresh air dries his lungs, they fail to create in him any increased resistance to the infection. Severe cases of tuberculosis, and those in a highly infectious state, are persuaded to enter special hospitals, where they receive treatment and are at the same time segregated from the rest of the community. This segregation, coupled with the undoubted fact that tuberculosis is slowly disappearing as our standard of civilization rises, seems to be the feature upon which the public tuberculosis service pins its hopes. The outlook has become preventive rather than curative.

This paper deals with an attempt to treat sufferers from the disease by raising their resistance. I am indebted to the medical practitioners of Salford for their encouragement and for their kindness in providing me cases. Another actuating cause for this investigation was the desirability of producing, if possible, an antigen of *B. tuberculosis* which would be in some way comparable in clinical efficiency to residual vaccines in general.

Caution prompted the use of Raw's attenuated strain as a preliminary, and various fractions of this and of a virulent strain were used until it was realized that such precautions were unnecessary and a waste of time, since the method of detoxication used for residual vaccines rendered the virulent strain safe for the patient. But a difficulty soon presented itself. It was found that the residual antigen, as at first prepared, possessed that disadvantage which is common to most of the tuberculins—it was liable to cause abscesses at the site of inoculation. This abscess formation was the basis of Bail's work on the aggressins, and observations made during the present investigation upon the pus

withdrawn by aspiration showed that recognizable bacilli were present, and that they could not be cultivated *in vitro*, so it is presumed they were the killed bacilli introduced in the antigen. The abscess formation was undesirable apart from the local trouble it caused, for no patient could be expected to submit to twenty or more injections, if most of them were to be followed by abscesses. Various attempts were made to overcome this, and finally the antigens about to be described were produced. Since their introduction over 2,000 doses have been given without a single example of abscess formation. The description of the two antigens as No. 3 the principal antigen, and No. 1 the auxiliary antigen, which is not always used, may be thought odd, so it should be explained that they are really the survivors of a series that once numbered over a dozen; the others have been dropped on grounds of inefficiency, redundancy, or of liability to cause abscesses.

Method of Preparation of Antigen No. 3.

The antigen is composed of human and bovine strains of *B. tuberculosis*. Cultures are made upon slopes of nutrient beef broth agar containing 2 per cent. of serum and 6 per cent. of glycerin. After inoculation the tubes should be sealed by dipping the plugs in hot wax to prevent evaporation. After fourteen days' incubation the slopes should be inspected, and if any show signs of growth only at one or two points they should be reinoculated by rubbing the points of growth over the surface of the medium. It is desirable to have a thick confluent growth in every tube, and this object is assisted by tilting the tubes, so that the water of contraction flows over the growth and keeps it moist. The strains are virulent. The human strain requires incubation for about six weeks and the bovine for eight weeks in order to ensure a growth of satisfactory thickness. For ease of description the quantities employed in the preparation are given as exact amounts, but can, of course, be used in the same ratios in any quantity. The slopes are made in test-tubes 6 inches long by $\frac{3}{4}$ inch diameter, and extend about two-thirds of the distance up the tube. The growth should cover the surface of the slope as completely as possible. This insistence upon the growth on the slope is not a crude method of estimating the dosage, but is designed to ensure that the prepared antigen will be considerably stronger than the standardized antigen ready for use: it is easier to dilute than to concentrate an antigen. The precise method of standardization will be described in due course. Thirty slopes of the human strain and ten of the bovine are emulsified in ether. The exact quantity of ether used is not important, but a convenient amount is 200 c.c. The suspension is placed in the ice-chest until next day, and is agitated at intervals. A rubber stopper should be placed in the flask immediately before setting the flask down in the chest. Risk of explosion is thereby

avoided. Next day it will be found that the bacilli have sunk to the bottom of the flask, leaving a clear fluid above. The latter is carefully poured off and discarded and the same quantity of fresh ether added. The suspension is shaken lightly and again placed in the chest for twenty-four hours. The ether is next poured off and replaced by 100 c.c. of normal saline, and again the exact amount is not important. The bacillary mass floats to the top of the fluid. The flask is immersed in a water-bath at 55° C. in order to boil away the ether. The floating mass should be stirred frequently, otherwise the vapour pressure beneath may suddenly blow it out of the flask. As the ether disappears the bacilli tend to sink and to go into suspension in the saline until, when all the ether has gone, a fairly smooth saline suspension results. This is put aside at room temperature for twenty-four hours and is shaken at intervals.

The next step is to centrifugalize the suspension. The supernatant fluid is discarded, and the bacillary deposit made up to 60 c.c. with distilled water. To this is added 1·5 c.c. of 40 per cent. NaOH and the fluid heated in a water-bath at 80° C. for one hour, shaking the flask frequently. The suspension is again centrifugalized and the supernatant fluid collected, placed in a flask and labelled Alkaline Extract. The deposit of bacilli is collected and made up to 40 c.c. with distilled water. The suspension will be alkaline, and it is neutralized by adding strong HCl a drop at a time and testing with litmus paper. When it is neutral 10 c.c. of liq. pepsinæ co. (B.P.), is added, the mixture is shaken for a few moments, then placed in the 37° C. incubator for eight hours. After this period it is put in the ice-chest overnight.

Next morning the suspension is added to the alkaline extract and the whole heated for ten minutes at 100° C. It is centrifugalized again and the supernatant fluid collected. The deposit is now at last discarded. The fluid is measured and sufficient phenol added to give it a content of 0·5 per cent. of phenol. When the phenol has dissolved, the fluid, still alkaline, is passed through a filter candle in order to remove any whole bacilli or other large particles.

The next procedure is to neutralize the extract with strong HCl, this added a drop at a time until the extract is very faintly alkaline to litmus paper. If the acidification is carried too far some of the protein constituents precipitate, forming a turbid fluid. The precipitate can be dissolved again at once by adding more alkali. The neutral fluid is placed in a flask and hydrogen peroxide (10 vols.) in the proportion of 1 in 50 added. The flask is shaken and set aside at room temperature for twenty-four hours.

The standardization follows and is performed with the nephelometer. Into a beaker 20 c.c. of the extract is taken and 0·2 c.c. of strong HCl

added. The fluid becomes opaque, and after a few minutes the particles coalesce into clumps which can be dispersed on shaking. The fluid is poured into one of the nephelometer cups immediately after shaking and the reading taken before the clumps have time to form. The standard used is the usual standard serum, and it will probably be found that the fluid has an opacity which is equivalent to about 60 milligrammes per 100 c.c. of standard protein. The pepsin extract itself when used in the proportion advised has been found to yield an opacity equal to 5 milligrammes per 100 c.c., so the net opacity of the proteins of *B. tuberculosis* present will be obtained by subtracting five from the reading obtained. The correct strength for administration is 12 milligrammes per 100 c.c., so the fluid must be diluted sufficiently to produce this result in the final dilution. The portion of fluid used for the estimation need not be thrown away. It can be neutralized again and poured back into the stock extract and the whole diluted down to the required strength. This is the No. 3 antigen. About one quarter of it should be taken out and diluted twice its own volume of saline. This is called No. 3D, and is more convenient to use for the initial doses, which are awkward to measure in the concentrated form. Finally the antigens are put into containers and sterilized in the autoclave for ten minutes at 110° C. They are then ready for use.

Preparation of Antigen No. 1.

Antigen No. 1 is an auxiliary to the main antigen and is used only in a certain type of case. It is simply a saline extract of the human type of Raw's attenuated strain of *B. tuberculosis* and is prepared in the following manner. The organism is grown in the same manner as for No. 3 antigen, and twenty slopes are taken as the standard quantity. The growth from the slopes is emulsified in ether as before, and the ether is changed once in the same way. It is poured off, and 100 c.c. of normal saline added to the bacterial deposit. The suspension is kept at room temperature for twenty-four hours as before. The whole is then centrifugalized, the supernatant fluid collected, and the deposit thrown away. To the fluid sufficient phenol to make a 0.5 per cent. solution is added and the fluid passed through a filter candle. The filtrate is put up in sealed containers and heated for sixty minutes at 70° C. on each of two successive days and is then ready for use. In both antigens the sole function of the ether is to render the bacillary wall more permeable to aqueous solutions. This rough standardization by counting tubes of growth is quite accurate enough for the No. 1 antigen as it is almost non-toxic at the stage in which it is used: the patient appreciates its injection little more than he would that of normal saline. At the same time I believe it to be of clinical value.

It will be observed that although the preparation of the No. 3

antigen follows that of residual vaccines in general, yet it differs in some important particulars. The total abolition of the risk of inoculation abscess that followed candle filtration was one of the most striking features of this investigation, and one can only assume that the bodies taking part in abscess formation are contained in the envelopes of the bacilli and are not present in the alkali and pepsin soluble fractions.

It is necessary to refer to the use of pepsin in the preparation. This is, I believe, novel, and was prompted by the desire to extract in soluble form the utmost from the bacilli. It was at one period used as a separate antigen, and as far as one can judge by the reactions produced, it was about equal in toxicity to the alkaline fraction. It is certainly not an inert product. The short heating together of the acid pepsin and the alkaline fractions was devised on the assumption that it might result in the extraction by the alkali of products previously resistant to alkaline solution. In any case it is necessary to heat the pepsin fraction in order to terminate ferment action.

The nephelometric method of ascertaining the concentration is also new and is much superior to the usual method of standardizing tuberculin by evaporating to dryness and weighing the residue. This latter method has an air of accuracy that is more spectacular than real. The residue in the case of Old Tuberculin, for example, actually consists of the bacilli, their toxins, by-products, the organic content of the unused medium, and of inorganic salts.

The proportion of salts in any medium is prescribed in its preparation, but no bacteriologist would pretend that he is aware of this proportion to within 0.01 per cent.; yet such a percentage must be large in relation to the weight of the bacterial protein present. The measurement by the nephelometer has not this disadvantage: the medium, by-products, and soluble toxins are all removed in the preliminary washings, and the exact proportion of salts is of no moment because they are not precipitated by the acid used for producing the cloud. The rapidity of the method is a further advantage.

The use of peroxide and sterilization at high temperature have been discussed in previous papers on residual vaccines. I am glad to acknowledge my indebtedness to Dr. Don of Salford Royal Hospital for his assistance in the standardization.

Dosage and Treatment.

The doses are measured in the minim scale, and I make no apology. This scale means that a hypodermic syringe graduated thus reads in effect to 17 parts of 1 c.c., and the minim scale will continue to be popular until syringe-makers supply syringes graduated to 0.05 c.c. I have even seen metric syringes graduated to 0.2 c.c. The doses are given into the upper arm into the belly of the triceps muscle. A case

that presents no unusual features or contra-indications commences with 3 minims of No. 3D antigen. A dose is given weekly, and each dose is increased by 3 minims until a dose of 15 minims is reached. Considerations of bulk then make it desirable to commence the use of No. 3 antigen, so the next dose will be 6 minims of No. 3, this being equal to 18 minims of No. 3D. The doses are now increased by 1 minim up to 8 minims, then by 2 minims up to 12, by 3 minims up to 18; the succeeding dose should be 22 minims, and the final dose 27 minims. In terms of weight of bacterial protein equivalent in opacity to standard serum these doses mean that the first dose is 0.007 milligramme and the last is 0.2 milligramme.

This outline applies to cases who present no general reaction lasting more than two days. If the general reaction last longer, the next dose should be the same in amount as the previous dose. But if a reaction lasts for six days no injection is given until the following week, when the previous dose is repeated without increase. The subsequent doses are increased by the scale as before. No notice need be taken of a local reaction at the site of inoculation. It is convenient to use the arms alternately for injection. There is not the slightest risk of inoculation abscess, and if a dose finds its way into the subcutaneous fat, it is of no moment. It will merely take a little longer to absorb. The No. 1 antigen is not used for pulmonary and genito-urinary tuberculosis; the only visceral form in which it is advantageous is for certain cases of peritoneal tuberculosis. Its chief use is in another type not discussed in this paper. The patient is weighed at the clinic every week; a fall of 1 lb. or so is not important provided it is not accompanied by other signs of reaction. Such fluctuations are common, and a case that gains 3 lbs. in one week will probably lose 1 lb. of it the next week.

In a chronic disease like tuberculosis the physical signs, with the exception of the weight, do not change rapidly, so that they are of no use as a means of gauging the reaction to a dose. The symptoms are more useful both for estimating reaction and for judging the progress of the case. Several symptoms are valuable in this respect; my own experience is that the most useful single symptom is the amount of energy or lack of it at the end of the day. Other symptoms that help are looseness of cough, deep intra-thoracic pain, dyspnoea, night sweats, and the amount of sleep obtained. It is important that the patient should be questioned prior to each dose, so that the quantity to be given can be estimated as accurately as possible. He should be examined upon every symptom, and his weight ascertained. The dose should be increased cautiously, as there is no advantage to be gained by causing a powerful reaction, and it is possible that harm might be done.

Some discretion is necessary in placing a correct value upon the symptoms described; thus a cough may be a manifestation of tuberculosis, or it may be part of a common catarrhal cold which the patient has contracted. In the latter case the cough is of less moment in deciding the amount of the proposed injection. It is as well to give some simple remedy for the cough, particularly if it prevents adequate sleep. Another symptom that calls for treatment is anorexia. This is not important if limited to the day following an injection, but if chronic the patient is frequently assisted by a mixture containing acid. hydrochlor. dil. (B.P.), given fifteen minutes before food. A patient will sometimes suggest taking a short holiday at some health resort, although he may be only half-way through the course of treatment. No harm results, and the patient frequently benefits. When he returns the treatment may be resumed as if no interruption had occurred. This subject of recuperation in a change of air is discussed more fully later. It is probably unwise to administer artificial sunlight during the period when the antigen is being given, but the old idea that this treatment is dangerous under any circumstances for visceral tuberculosis is not now universally accepted.

Several patients have been treated after the result of antigenic treatment has been assessed by their doctors, and no untoward results have been seen. On the contrary, the results have been distinctly beneficial. This is not surprising because, before commencing sunlight treatment, they had had their resistance appreciably raised by the inoculation with the antigen. At the same time a case that is obviously going downhill should not be irradiated. The treatment should be reserved for cases that are improving or stationary. It is neither necessary nor desirable to administer the treatment on the usual scale. All that is required is a short course of about 14 days designed to give the mildest of tonic effects. At that point it should cease and the patient be permitted to settle down to the routine of his normal life. Sunlight treatment is unnecessary when a patient proposes to take a short holiday after the course of inoculation, but it is a useful substitute for those patients who find it an economic impossibility to absent themselves from their work.

The scale of doses should be looked upon as a broad scheme in which almost any patient will develop some variation from the average. Thus one patient may progress normally in the scale until a point is reached beyond which he does not appear to develop tolerance. When this occurs the dose should be given two or three times without increase, then a week's rest should be given and the increase of dose cautiously tested again. This type of case is not common. A more usual type is that in which the patient takes the dose without the slightest sign of reaction: here the amount of the weekly increase

can be made a little larger, but always bearing in mind that a strong general reaction is undesirable.

The last dose in the scale is 27 minims, but some cases that show a slow but steady improvement may be given an extra dose of 33 minims and possibly a further one of 40 minims. Again everything depends upon the individual and his idiosyncrasies.

Type of Case to be Treated.

The essence of any test of treatment is that the patient shall change from worse to better, therefore it was not desired to treat quiescent cases or those in which the diagnosis was doubtful. No limit was placed upon the extent or type of the disease, consequently several of the cases treated were as hopeless as it is possible to conceive: some were bedridden, and at least one only left her bed to attend the clinic—incidentally this patient did well.

In such cases it was recognized at the outset that no form of treatment offered any reasonable prospect of success: on the other hand, they demonstrated the limits of efficiency of the treatment. All the cases were going downhill when first seen, nearly all had tubercle bacilli in the sputum, and many had undergone at least one period of sanatorium treatment, which means that that method of relief had been tried on one or more occasions and had failed. The prognosis of cases in whom the sputum is positive is generally considered by clinicians to be bad, so that a survey of the foregoing facts demonstrates that the group treated was not a fair "cross section" of pulmonary tuberculosis in the community, but rather consisted of those cases that were deteriorating in spite of the accepted method of treatment.

Occasionally a patient who had started antigenic treatment was offered a bed in a sanatorium. No attempt was made to dissuade him from going: he was encouraged to go on the ground that the conventional remedy should come before any newer treatment, and the relative merits of the two were not discussed. How many were approached without my knowledge to re-enter a sanatorium and refused to go I do not know.

The type of case treated is further illustrated by the proportion of certain symptoms and the state of the sputum: tubercle bacilli were present in 79 per cent., night sweats in 45 per cent., cough in 85 per cent., and loss of weight in 57 per cent. The patients that had had previous treatment in sanatoria, thirty-five in number, had spent amongst them a total of fifty-five periods in these institutions.

General Results.

In the first place the results have been declared by the private practitioner or other clinician in each case. This method is preferable as it removes any suggestion of natural bias on my own part, and

the final opinions are therefore the massed decisions of some thirty independent observers. In many instances the improvement has been remarkable, but it would be idle to consider cure at this stage, so the results have been reduced to the simplest and most incontrovertible terms—improved, or failed to improve. In pulmonary tuberculosis it is customary to speak of arrested cases—that is, those cases in which the patient maintains the same state over a period, becoming neither better nor worse. Such cases in this series are called failures.

The total number of cases treated was ninety-eight, but a number of these did not attend for the full course: of these latter twenty-two received less than five injections, and I have ignored them except in two instances where death occurred within a few weeks of the last injections. I have included these two amongst the failures on the ground that they might have attended and still failed had they lived. Several of the failures received only half or less of the full treatment, and it might be said that they should not be counted, but I prefer to assume that they would have attended had they been able. Ten other cases were not assessed for result because their original condition was very good or because of irregular attendance. The final number left for critical assessment was therefore sixty-seven. In short the guiding rule has been to discount every success and count every failure in the hope of arriving at truth stripped of as much uncertainty as possible.

Of 35 cases who had sanatorium treatment 21 were improved, 7 failed to improve, and 7 are dead. This gives 60 per cent. improved; 32 cases who had not been in sanatoria showed 24 improved, 5 failures, and 3 deaths, giving 75 per cent. improved. The total of both groups, 67 in all, shows therefore 45 improved, 12 failures, and 10 deaths: these figures mean that 67 per cent. of all cases were improved. At first sight it may seem that the patients would have been better off if they had never entered a sanatorium, but such an inference is false: it simply indicates that they were older cases and therefore more advanced.

Clinical Comments.

It will be observed that the symptoms are discussed in much greater detail than are the physical signs: the former were recorded at the clinic and were carefully watched because they were used as the index for the dosage. The results record the condition of the patients when they had completed the antigenic treatment and are fairly satisfactory as far as they go, but amongst many uncertainties one thing is certain—some of the improved cases will relapse. For this reason it is imperative that further enquiries should be made in about six months' time as to their fate. It has been observed that one or two cases which were apparently failures or dubious successes at the end

of treatment commenced a slow but steady improvement later, and it will therefore be of interest to ascertain how the failures have fared also. At the present moment one can only speculate, and the question may be left at that.

The results can be compared to those obtained by sanatorium treatment. It is an unfortunate fact that most cases treated in sanatoria tend to relapse as soon as they return to the home environment, and this circumstance is to be contrasted with the immediate results of antigenic treatment. In the latter the patient improves whilst living in the same back streets in which he originally contracted the disease. If the majority of the patients relapse it might be urged that the results are the same as those obtained by sanatoria, but at a minute fraction of the cost to the community. This view implies an antagonism or rivalry between these two methods of treatment, and I am not satisfied that such is the case.

A few patients have taken a short holiday at some health resort immediately after the completion of treatment, and it has been noticeable that the benefit so obtained has been considerable, decidedly more than one would expect. If any inference can be drawn from this observation it is that the patient is in the best condition to profit by a change, and therefore that the most advantageous time for a sojourn in a sanatorium or similar institution is immediately the antigenic treatment has been finished. Such a scheme appears to be the only rational combination of the two forms of treatment, and if an arrangement cannot be made with existing sanatoria then an independent organization should be evolved.

A patient who had improved on antigenic treatment would not need to spend a prolonged period at such an institution: it is probable that six or eight weeks would be ample. None of the elaborate equipment of a hospital is necessary, consequently many patients of moderate means should be able to provide the essentials for themselves—a fairly dry climate, sunshine, fresh air, wholesome food, and rest with quiet exercise.

The duration of antigenic treatment for pulmonary tuberculosis is longer than that advised for other infections treated with residual vaccines, and it is necessary to point out that improvement is steady but hardly ever dramatic, so that it is of cardinal importance that the patient shall receive the full course of treatment; which implies that a moribund case who will probably cease treatment after a few injections is better left alone: he certainly should not figure in any statistical record of the clinical efficiency of this treatment. Finally it should be realized that these results, good or bad, were obtained in a district notorious for diseases of the respiratory tract and during the worst climatic period of the year.

Summary and General Conclusions.

1. It is possible to prepare a residual antigen of *B. tuberculosis* which will never cause an inoculation abscess.
2. The immediate clinical results approach those obtained with the residual antigens of other organisms.
3. Approximately two-thirds of all cases of pulmonary tuberculosis can obtain appreciable benefit from this antigen.
4. The duration of the improvement is at present unknown.
5. As with every other antigen, the best results are obtained with cases that still have some powers of resistance left. If all cases are treated early or obviously hopeless cases excluded, the immediate improvement would probably exceed the two-thirds described in this paper.

THE ACTION OF ULTRA-VIOLET RAYS ON THE SKIN.

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THE irradiation of the skin with ultra-violet rays produces a series of photo-biological and photo-chemical changes. The development of the erythema of the skin indicates a disturbance in the circulation, which occurs locally at the site of irradiation. The nature of this erythema is characteristic of the response to radiations from 2,970 to 2,500 A.U. Recently it has been shown that rays of 9 to 7 A.U. can produce a similar type of skin reaction. It has been suggested that the erythema is due to the abiotic action of ultra-violet rays, and that the damaged superficial epithelial cells activate "necro-hormones," which finally produce typical reactions to light. Experiments with extracts of tissues, including skin extracts, do not confirm this theory. It has been shown that the damage of many of the tissues liberates a substance which has been isolated and recognized as histamine. But the reaction of the skin to light and the changes produced in the skin by histamine are not identical. It is difficult to explain—the latent period preceding the production of erythema and the localized reaction which is obtained with ultra-violet rays. The common irritants and blistering agents produce widespread reactions of the skin, irregular in nature, but which correspond to the distribution of the posterior-nerve root area supply of the skin.

Further experiments on irradiation have shown that the erythema of the skin is only obtained when there is a normal capillary circulation. In the regions of scar tissues—in conditions of ischæmia or by obliteration of the capillaries by artificial methods, such as freezing or the use of adrenalin—irradiation of the skin modifies the reaction and production of erythema. It is difficult to explain the difference in the sensitiveness of the skin of the child up to two years of age. Rollier's theory that the pigment of the skin, melanin, acts as a photo-dynamic substance cannot be maintained. The normal white skin is sensitive to ultra-violet rays from 2,970 to 2,500 A.U., and this sensitiveness is comparable to the effect of visible rays on the photographic light sensitive plate. There is, in all probability, some photo-biochemical effect produced, which controls these reactions, which are typically characteristic of light erythema.

The evidence which has been described by Rosenheim and Webster has proved that the activation of ergosterol by ultra-violet rays and the product obtained is in all probability vitamin D. This may indicate the nature of the photo-chemical mechanism of irradiation. The action of ultra-violet rays on the fats and sterols in the superficial layers of the skin can explain the definite protection against rickets which has been successfully obtained by exposure of the human child's skin to sunlight and artificial sources of radiation. It must be realized that up to the present time there is no evidence to correlate this action of rays on the sterols and the erythema reaction of the light. My experiments on the effect of light on skin extracts tested *in vitro* and *in vivo* have so far completely failed to reveal evidence of the production of any photo-chemical substances.

The histological examination of the changes in the skin following irradiation indicate alteration in the epidermis and in the capillary circulation. The partial destruction of epidermal cells in the stratum corneum has been described by Gassul and other observers. Intensive irradiation produces blistering and necrosis of the skin. The normal erythema dose of light demonstrates marked changes in the capillary circulation. One hour after irradiation of the skin there is evidence of marked dilatation of the capillaries which are engorged with blood-cells. This is followed later by the exudation of plasma and production of a fibrinous exudate in the interdermal tissue, and extending to the subcutaneous tissue. The polymorphonuclear cells aggregate in the capillaries, and lie in proximity to the endothelial lining of the lumen; the endothelial cells are swollen and enlarged. Diapedesis of the polymorphonuclear cells can be readily observed; these cells wander into the interdermal layers of cells, and finally aggregate as a dense infiltration of white cells amidst the whole structure of the skin. These observations conclusively prove that the erythema dose of light pro-

duces a marked local hyperæmia, and excites a local white cell infiltration of the epidermal tissues. The action of light appears to cause a profound effect upon the endothelial cells and the passage of fluids through the walls of the capillaries. The extensive exudation of plasma gives rise to the intradermal œdema of the tissues, which is so characteristic in the irradiated skin. The effect of ultra-violet irradiation of the skin is similar, but in a much milder extent, to the histological changes which are seen in the skin of animals sensitized with photodynamic substances, and exposed to visible rays. The changes in the capillaries and the blocking of the lumen with white cells have been described in detail by Campbell and Hill. The damage which is produced may be sufficiently intense to cause death by intravascular thrombi and embolic infarction of bloodvessels in the vicinity of vital organs. The extensive necrosis of the skin and subsequent gangrene which has been observed can be attributed to circulatory disturbances.

The study of the effect of ultra-violet irradiation of the skin on the bactericidal properties of the shed defibrinated blood tested *in vitro* has proved that the minimal erythema dose of light can increase the bactericidal power of the blood. The maximum effect is obtained by irradiation of about 20 to 30 sq. cms. of skin per kilogramme weight. It has been shown that this bactericidal action originates locally at the site of irradiation, and is carried by the bloodstream into the general circulation. So far it has not been possible to isolate a bactericidal substance from extracts of irradiated tissue—*i.e.*, the skin—but the difficulty in the preparation of a suitable skin extract has impeded this research. The bactericidal response of the blood following ultra-violet irradiation may be due to the action of light on the skin or the blood capillaries, the endothelial cells, or some other factor. The fact that increase in the bactericidal power of the blood follows ultra-violet irradiation of the peritoneum, the abdominal viscera, and the subcutaneous tissue may support the theory that the irradiated endothelial cells are responsible for this bactericidal action of light. But the penetration of ultra-violet rays is slight, and the greatest absorption occurs in the superficial skin cells. The primary effect may originate in the superficial layers of the skin, in the region where the rays are absorbed. The substance which is formed may have effect on the endothelial lining of the blood capillaries, and in this way demonstrate the characteristic changes associated with erythema. If the effect of ultra-violet rays is due to direct action on living cells, or if it is due to irradiation of a chemical substance, is a problem for future speculation.

The hyperæmia of the skin which is produced by infra-red rays and luminous rays is due to the dilatation of the bloodvessels. Associated with ultra-violet rays, a rapid and intensive erythema is observed following irradiation. A similar type of reaction has been described by

many observers who have irradiated the skin with ultra-violet rays, and then directly after exposed the irradiated area to infra-red rays. The effect of this reaction is less painful and less irritating than the normal response, and does not have such lasting effects. This is due to the screening effect of the blood in the dilated and engorged blood capillaries, which restricts the action of the ultra-violet rays to the more superficial layers of the skin. Cooling the skin and the use of compression causes a deeper and more intense reaction owing to the greater depth of penetration of the skin-sensitive rays.

The local effect of ultra-violet rays increases the immunity of the skin, and promotes a local bactericidal response. This may explain the beneficial action of the local irradiation of lupus lesions. The increased leucocytic infiltration of the skin, or the production of a direct bactericidal photo-biochemical agent with irradiation, may develop a highly bactericidal and immune skin. Our knowledge of tissue immunity is limited; but although there is evidence to support this theory that the irradiated skin has a greater local resistance to microbic and viricidal infections, excessive dosage with light producing marked erythema, blistering and necrosis of the skin will create an excellent culture medium for bacteria, and in this way aggravate and excite the spread of infection.

The present confusion in the technique of treatment with sources of irradiation is due to the failure to recognize the difference between reactions due to ultra-violet rays and reactions due to visible and heat rays. The former depend upon the action of rays at the surface layers of the skin, and are photo-biochemical agents. The latter are due to heating effects, and are similar to other methods of radiant heat-therapy, producing (1) dilatation of blood capillaries; (2) acceleration of blood flow; (3) sweating. Except under exceptional circumstances, when special photo-sensitive substances are present, there is no similarity in action; but as the frequency of the rays of light increase, the biological action of visible rays gradually merge into the phenomena associated with ultra-violet irradiation.

The present conception of the action of ultra-violet rays on the skin supports the theory of the production of (1) local photo-biochemical substances which have bactericidal or vitamin properties; (2) local hyperæmia of the skin; (3) stimulation of a leucocytic infiltration of the epidermal tissues.

ASSOCIATIONS AND INSTITUTIONS.

THE SURGICAL TUBERCULOSIS CLINIC, "LA MOUBRA," MONTANA, SWITZERLAND.

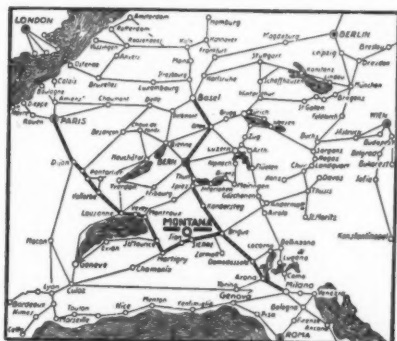
MONTANA, in the Canton of Valais, at an altitude of 5,000 feet, and high up above the Rhone Valley, has justly won a foremost place among the health stations of the world. It is a resort specially favoured by British tuberculous and tuberculously disposed patients. At this famous natural sanatorium has recently been opened a private clinic for all forms of surgical tuberculosis (involving bones, joints, glands, peritoneum, intestinal tract, uro-genital organs, and the like) by heliotherapy, actinotherapy, and, where necessary, operative measures.



"LA MOUBRA" SURGICAL TUBERCULOSIS CLINIC, MONTANA,
SWITZERLAND.

The clinic is situated on a fine plateau in the vicinity of extensive pine forests, and with a glorious panoramic view from its solaria of the snow-capped mountains of the Valais Alps. Montana (which is only twenty hours' journey from London) has the advantage of possessing a greater daily sunshine record than that of any other "cure" station in Switzerland. The clinic has been established by Dr. Eugène Ducrey, formerly Chief Assistant to the Surgical Clinic at Basle, now Chief Surgeon to the General Hospital at Sion, and the leading surgeon in the Canton of Valais. "La Moubra" can accommodate forty patients. It is constructed entirely of stone and concrete, and has been designed and built in accordance with the most recent plans for sanatorium construction. There are admirable solaria, private balconies, well-lit rooms, two operating theatres (one for aseptic and the other for septic cases), and all the latest technical appliances for effective diagnosis and

treatment are available. Each patient's room is provided with hot and cold running water, and is equipped with telephone and wireless installations. There is efficient central heating throughout. Dr. Ducrey is in daily attendance, and the staff includes two assistants and



SECTIONAL MAP OF SWITZERLAND SHOWING
POSITION OF MONTANA.

fully trained nursing sisters for both day and night service. The Clinic now has its own motor ambulance for summer use and a sleigh ambulance for winter service. Patients can, therefore, be transported in perfect comfort direct to the Clinic from the train at Sion, on which there is a through carriage from Calais. "La Moubra" should certainly prove to be a valuable addition to the surgical treatment centres of Switzerland. The charges are from 25 francs (approximately £1) a day. Further information can be obtained on application direct to the Manager.

The Joint Tuberculosis Council, of which the Hon. Treasurer is Dr. James Watt, King George V. Sanatorium, Godalming, Surrey, and the Hon. Secretary, Dr. Ernest Ward, Torquay Road, Paignton, Devon, are arranging for a dinner to welcome Canadian tuberculosis workers who will in October next be visiting this country on their way to the International Congress, which is to be held in Rome. It is proposed to hold the dinner on Tuesday, October 16, at Verrey's Restaurant, Regent Street, London, during the Meeting of the National Association for the Prevention of Tuberculosis. Tickets 10s. 6d. each.

NOTICES OF BOOKS.

TUBERCULOSIS IN MAN AND ANIMALS.

PROFESSOR CALMETTE'S classical work on tuberculosis is now in its third edition.¹ The fact that the earlier editions became rapidly exhausted necessitating the preparation of a more exhaustive issue is in itself proof, both of the importance of the work and the scientific authority for which it stands. The present volume dealing with processes of infection and defence, particularly of tuberculosis in man and animals, contains so much of interest and detail, that in a short review it is only possible to indicate an outline of the contents and emphasize some of the more recent work in relation to experimental preventive vaccination. A short historical introduction is of interest, but the main contents are divided into four parts. Part I. deals with the morphology of the tubercle bacillus, its isolation and culture, and the influence of physical and chemical agents upon it. An interesting chapter is devoted to the toxines obtainable from the bacillus, and the various tuberculins introduced from the time of Robert Koch. The portals of infection, particularly in children, are fully described, also the characters of tuberculosis as affecting the serous membranes, osseous and articular system, and cutaneous lesions. The rôle of heredity in this bacillary infection is discussed, and the generally accepted view concurred in, that, with rare exceptions, infection is *after* birth, and that a specific sensitivity to the infection may be transmitted. Part II. describes experimental tuberculosis (infected by various routes) and also tuberculosis as occurring in animals, the bovine type in particular, also in other domestic ruminants—the horse, ass, pig, cat, dog, and in wild animals, birds, and fish. Part III. covers the field of defensive reactions of the organism against infection, including the cytology of exudates, cyto-diagnosis, changes in the blood, and elimination of the bacilli; auxiliary reactions such as réaction d'Abderhalden and its application as a diagnostic aid; sedimentation of the red cells is stated to have no value as regards any specific character, though it may be of value as a help in prognosis. The last part gives some statistics of interest relating to the occurrence of tuberculosis amongst the various races of the world, and then describes in detail the various attempts and methods employed for obtaining a passive immunity to tuberculosis—by sera, biological and chemical means. The experience obtained in experimental vaccination against tubercle, and particularly vaccination of the newly born child, is fully described. The whole section devoted to vaccination (experimental) by B.C.G. (Bacille bilié Calmette-Guérin) with the earlier results obtained from July, 1921, to July, 1924, and further experience gained since the latter date would

¹ "Tuberculosis in Man and Animals," by A. Calmette, with the collaboration of A. Boquet and L. Negre, Directors of the Laboratory of the Pasteur Institute. Third edition. Pp. 881, with illustrations in colour and black and white, and with graphs and index. Paris: Masson et Cie, editors. Libraires de l'Académie de Médecine, 120, Boulevard St. Germain, Paris vi. 1928. Price 125 francs.

be worth publishing in separate form. The earlier experimental inoculations (preventive), whether by injection for all ages, or ingestion in the case of the newly born, it is claimed showed (1) that it was possible to confer a manifest resistance against virulent tuberculous infection; (2) that the preparation was harmless for all sensitized mammals as well as for domestic birds. A first series of vaccinations in 1921-1922 was made on 120 infants, of whom 80 were reviewed four years later, 24 of them lived in the midst of infected conditions, one was in constant contact with a tuberculous mother and two with a tuberculous father. The results among these showed the vaccination to be harmless. The complete tolerance of the intestine in infants, even those born before term, led to an increase in the dose of B.C.G. from one to three centigrammes—that is to say, one thousand two hundred millions of bacilli. From 1922-1925, under similar conditions, Weill-Hallé and Turpin vaccinated 317 infants with which they have been able to keep in touch. Of these 236 lived under satisfactory conditions and 67 were born and brought up in the midst of infection, 24 of these latter had tuberculous mothers. Forty died of diseases non-tuberculous. Of the total number of the 67, only one (1.5 per cent.) died of tuberculosis. The early results led to a widespread demand for B.C.G. for preventive inoculation purposes, and a necessary organization for its distribution and collection of records had to be established. On the further experience gained since 1924, it is claimed that a mortality of 24 per 100 in infants *vis-à-vis* with familial infection has been reduced by preventive inoculation to less than 1 per cent. Also it is stated that the method is rapidly being accepted by the greater number of doctors whose work lies amongst children of the tuberculous, and has spread to those countries where laboratories are established in which the vaccine emulsion can be prepared. While a final judgment cannot be yet formed as to its ultimate value, it must be recognized that Calmette's work deserves close consideration, and no serious student of tuberculosis but should make himself thoroughly acquainted with the details of preventive inoculation with B.C.G. Its general adoption and application should only be cautiously approached, and conclusions at present appear premature. The volume is one of great value in its comprehensiveness and suggestive work, as well as indicating a fresh path and line of treatment for combating the incidence of tuberculous infection. The work is well illustrated and includes many beautifully coloured plates, also a useful index.

G. BASIL PRICE, C.M.G., M.D., F.R.C.P.

COLLAPSE THERAPY IN PULMONARY TUBERCULOSIS.

Dr. Hanns Maendl has just published an important work on Collapse therapy in pulmonary tuberculosis.¹ It is based on some 600 or more cases treated within a period of twelve years, and contains abundant reference to contemporary literature and so provides a fairly complete account of the treatment of pulmonary tuberculosis by collapse of the lung. The author favours a blunt needle and a fixed-

¹ Die Kollapstherapie der Lungentuberkulose: mit besonderer Berücksichtigung des künstlichen Pneumothorax." Von Primarius Dr. Hanns Maendl, Chefarzt der Heilanstalt Grummenstein. Pp. ix + 206, mit 116 Textabbildungen. Wien: Verlag Julius Springer, Scholtengasse 4. 1927. Price, Broschirt, Reichsmark 17; Gebunden, Reichsmark 20.40.

cylinder apparatus for induction, and has never experienced any accident of consequence among the many thousands of gas fillings he has given. His method of collapse begins with a low pressure (*entspannungs*) pneumothorax, and further passage to a "compression's pneumothorax" is made the question of individual decision in each case. A very full account of possible pneumothorax "accidents" is provided, including such easily forgotten possibilities as hæmoptysis from perforation of the lung by a sharp induction needle, and also hæmoptysis from one or other lung following refills apart from lung perforation. Under the heading of empyema associated with pneumothorax he describes, from the Sauerbruch clinic, a method of thinning the pus and removing membranous deposits by the use of pepsin and hydrochloric acid. A little further on the writer of this review finds himself credited (unexpectedly, and, alas, undeservedly!) with the idea of producing effusion in dry pneumothorax cavities by the injection of 30 per cent. sugar solution. The author has found this method useful in furthering collapse of the lung, and has even pushed the idea to the extent of producing an acute pleurisy by the intrapleural injection of a serous exudate from another patient, kept for some months but containing numerous tubercle bacilli. The results of this experiment are claimed to have been satisfactory in all respects. Under the treatment of adhesions, after an account of Jacobæus' method of cauterization, a new form of thoracoscope introduced by Maendl and Kornitzer here receives description. This instrument takes lamp, mirror, and cautery all on a single stem, and no separate puncture for the introduction of the cautery is required. All the parts can be boiled, which cannot be done with Jacobæus' apparatus, and diathermy takes the place of electro-cauterization for division of the adhesion. Nine cases have been treated with this apparatus with no pleural effusion or other untoward result. Bilateral pneumothorax and collapse treatment in childhood received due notice in this book, though oleothorax is omitted. In addition there is given a fairly adequate account of phrenicotomy and of thoracoplasty. Dr. Maendl's book is usefully illustrated with X-ray plates and diagrams, and contains an adequate index, and a bibliography which does not neglect English and French literature, and provides altogether an account of lung-collapse therapy which should prove of considerable value to students and practitioners.

CLIVE RIVIERE, M.D., F.R.C.P.

PULMONARY TUBERCULOSIS AND RADIOGRAPHY.

Dr. Jacques Stephani, of Montana in Switzerland, has just published a work which should be in the hands of every medical adviser dealing with cases of pulmonary tuberculosis.¹ The book is dedicated to the author's father, whose name has been so long associated with the famous sanatorium situated at Montana. It is a very pleasing and well-written record of a man's own work as he has carried it out, embodying an account of the changes and advances made during many years, and leading to the high grade of efficiency in diagnosis which has been attained. Though Dr. Stephani does not hesitate to quote the views

¹ "La Tuberculose Pulmonaire vue aux Rayons X," by Dr. Jacques Stephani. Pp. 288, avec 161 illustrations. Paris: Payot, 106, Boulevard St. Germain. 1928. Price frs. 75.

of other Continental authorities on many points which are open to discussion, the information he gives us is essentially the result of his own experience and observation, backed by the clinical knowledge and acumen of his father. The necessity for close association between the clinical and radiological examinations is fully understood at Montana: "Stethoscope, screen, and film are the three instruments of first importance in investigating the lungs." The screen is used to note movements, the film to record the delineation of the lung shadows. There are many traps for the unwary in the interpretation of the shadows and superimposed shadows arising not only from the polymorphism of images of the normal, but from the similarity of effects produced by different pathological processes. The films are considered in conjunction with the history and physical signs of the case. There is full information as to the apparatus and technique employed. The author is an advocate for the gas tube at a moderately high voltage, good screens, a distance of at least a metre, and a short exposure. He gives much specific detail concerning tubes, films, screens, exposures, etc., stating frankly his own choice in each instance, and giving the reasons which governed his decision. Different pathological processes found in the successive stages of the various types of tuberculosis are considered in relation to the appearances produced on the film. Success in the demonstration of small lesions has sometimes followed varying the positions of the tube or patient, so as to project suspected areas clear of the shadows of dense organs or tissues. In considering the classification of cases, Dr. Stephani quotes several other writers, but falls back on a grouping of his own which is based partly on pathological and partly on radiographic grounds. He distinguishes between the minute opacities of the hæmatogenous miliary type of disease and the broncho-pneumonic forms beginning in the alveoli. He points out that obvious hilar glands are frequently associated with a lesion in the lung fields, even when this cannot be demonstrated. He discusses the difficulties arising from the concurrence of different types of the disease affecting different areas in the same lung picture. Pleural complications, cavity formation, and pneumothorax, whether spontaneous or artificial, are carefully considered, with many diagrams and illustrations. There is a useful bibliography, and the indexes are good. A feature of the work is the good collection of illustrations, both from reductions of whole chest prints, and, in order to show detail, from portions of prints reproduced in actual size. Full text, with short notes, accompanies each figure. There are no doubt points on which some disagreement may occur—*e.g.*, as to why the case illustrated in Fig. 91, p. 174, should be described as tuberculosis—but the work is a valuable one, which will be much appreciated by all interested in the study and treatment of intrathoracic tuberculosis.

J. E. A. LYNHAM, M.D., M.R.C.P.

To the admirable "Tuberkulose-Bibliothek," edited by Professor Dr. Lydia Rabinowitsch, there has been added, as No. 32, a serviceable atlas of skiagrams of the lungs, prepared by Dr. H. Alexander and Dr. A. Beckmann.¹ It is a most useful atlas of the X-ray pictures of tuber-

¹ "Röntgenatlas der Lungentuberkulose des Erwachsenen," II. (Spezieller) Teil, von Dr. Med. Hanns Alexander und Dr. Med. Arthur Beckmann, des Sanatoriums Agra. Pp. v + 193, mit 130 Röntgenbildern und 1 Abbildung im Text. Leipzig: Verlag von Johann Ambrosius Barth. 1928. Price Rm. 17; vorzugspreis Rm. 13.60.

culosis as seen in the routine of any chest hospital. The clinical features of the case accompany each illustration, and, with the radiological interpretation, are so placed that the text and the figure are on opposite pages. The paper and type and general quality of the illustrations maintain the degree of excellence one has learned to associate with this series.

J. E. A. LYNHAM, M.D., M.R.C.P.

DUST AND TUBERCULOSIS.

Dr. Franz Ickert has contributed an interesting monograph to the series, "Die Tuberkulose und ihre Grenzgebiete in Einzeldarstellungen," edited by Drs. L. Brauer and H. Ulrici.¹ It is essentially a summary and critical review of the literature dealing with diseases of the lungs which are caused by dust, and their association with pulmonary tuberculosis. Under the comprehensive title of "Staublungentuberkulose" pneumokoniosis, anthracosis, silicosis, chalicosis, etc., are all referred to, with classified information concerning the social aspect and mortality of dust diseases. The dusts which induce fibrosis of the lungs are inorganic; organic substances may contribute where the disease has already begun, but are not causative. Experiments have been performed on animals, and the changes in the lung tissues at various stages have been fully investigated by the microscope. The pathological anatomy of the fibrosis is discussed in detail, with the origin and rôle of the "dust cell." The radiological appearances are well described with several good illustrations, the cases being classified into three groups according to the stage of the disease. The clinical symptoms and signs and their relation to the radiographs are considered. Figures giving the percentage incidence of tuberculosis are quoted from reports in many different countries. At the end of the book are several pages of references, given with care and accuracy, which add very greatly to the value of this comprehensive and informative work.

J. E. A. LYNHAM, M.D., M.R.C.P.

ASTHMA AND ITS TREATMENT.

Dr. André, in his recently published treatise on asthma, deals with its ætiology, pathogeny, and treatment,² following in the main the lines of Montcorgé, Delthil, Mouriquand, and Sedillot, all of whom appear to have been inspired by the belief of Glénard that deficiency in the various functions of the liver is the root of most bodily ailments. This view regards asthma as a "uracémie respiratoire" occurring on an arthritic diathesis. At first blush such conception is apparently a wild one and has been rejected by certain authors, including Marcel Labbé; whilst others, such as Vidal, Abrami, and their pupils, after having rejected it, have felt the necessity of replacing it in order to explain certain facts, and postulate therefore a "colloidoclastic diathesis." From the arthritic manifestations which appear therein, it is but a step to

¹ "Staublunge und Staublungentuberkulose," von Dr. Franz Ickert, Regierung und Medezinalrat in Gumbinnen, Ehemaleg. Leiter der Tuberkulose-Fürsorgestelle in Mansfeld. Pp. 64, with 7 illustrations. Berlin: Julius Springer, 23 Linkstrasse. 1928. Price R.M. 4.80; Gebunden R.M. 6.90.

² "L'Asthme et Son Traitement: Etiologie, Pathogénie, Diagnostic," par le Dr. J. André, Médecin Consultant aux Eaux du Mont-Dore. Pp. x+360. Paris: J. B. Baillière et Fils, 19, rue Hautefeuille. 1928. Price Frs. 30.

enlarge the boundaries, and to seek a wider field in the terrain of arthritis. As a student one was taught carefully to enquire into a personal or family history of gout, eczema, and nervous symptoms, including muscular and joint pains, when investigating any new case of asthma, and there is much virtue in approaching this malady from a wide constitutional aspect. The author's views along these lines are however, based chiefly upon clinical experience, and before such can be accepted as a part of the teaching of practical medicine considerably more experimental work is requisite. The section on treatment is well written and up to date, mention being made of the favourable effects of ephedrine and of endocrine therapy in appropriate cases.

J. F. HALLS DALLY, M.D.

TUBERCULOUS INTOXICATIONS.

Dr. Hollós has written a book on Tuberculous Intoxications which is certainly a remarkable one.¹ It appears to be a fantasy of dogmas, couched in language which, to my doubtless insufficiently instructed mind, is frequently unintelligible. For example, when the author says on page 111 that "the phthisis appearing without symptoms of intoxication is, in the majority of cases, malignant," I do not know what he means. The title of the book is "Tuberculous Intoxications," but this is scarcely an adequate guide to the contents of a work the object of which appears to be to declare the almost infallible specificity of tuberculin and expound "the immune blood treatment" *when properly administered* (this phrase being always in italics). "The author wishes to state," he writes in his conclusions, "that the tuberculins, and especially Spengler's immune blood, *properly administered*, are at least remedies as specific as salvarsan is for syphilis, particularly in those forms of tuberculosis which comprise the substance of this book." In this substance we find endocrine disturbances, neurasthenia, rheumatism, neuralgia, thyrosis, epilepsy, dysmenorrhœa, psoriasis, gastric and intestinal disturbances discussed. The proof of the association of these conditions with tuberculosis in the cases quoted appears to rest entirely on the personal opinion of the author and the favourable reaction to immune blood. For example, on page 27 a lady is described as having sensations of fear, slight hæmoptysis, and brought up much "bacillus free" sputum. After the first injection of immune blood she loses her fear, and after some months of treatment she is cured. The author's method appears to be to diagnose tuberculosis on the slenderest foundations, ascribe to it many symptoms, and then proceed to cure a hypothetical disease by a remedy about which there are two opinions, only one of which is right, however, according to the author. For example, on page 18, Case 5, a girl twenty-two years old: "She had suffered from severe headaches for many years. These headaches recurred every day and sometimes incapacitated her for work. She tired quickly and easily. She had lost her appetite, but, nevertheless, was gaining weight. Her hair began to fall out. Menstruation started late and was frequently absent; flowed but little

¹ "Tuberculous Intoxications: Concealed and Masked Tuberculosis. A Clinical Study." By Joseph Hollós, M.D., Pathologist of St. Vincent's Hospital, Staten Island, New York; with a Preface by the late Antone Poucet. Pp. ix + 132. Edinburgh: E. and S. Livingstone, 16 and 17, Teviot Place. 1928. Price 10s. 6d.

at a time. She had no sexual desire. In the fairly developed pale girl I found a slight trace of fibrous tuberculosis in one of the apices. As indicated by the symptoms, I made the diagnosis of diminished thyroid function of tuberculous origin. Thyroidin was given hypodermically every day, later every second day, with a complete disappearance of the headaches; as soon as the thyroidin was stopped they reappeared. Now immune blood treatment was instituted, and the headaches, as well as the other symptoms, disappeared and sexual desire reappeared." On page 39 we read: "On the basis of a review of the literature and mainly through my own observations, I am forced to conclude that, in the vast majority of cases, rheumatic arthritis is nothing but one of the masked forms of concealed tuberculosis." This statement, like several similar ones in the book, seems to the reviewer to indicate the danger of extreme specialism.

F. G. CHANDLER, M.D., F.R.C.P.

A TEXTBOOK ON TUBERCULOSIS.

"Every practitioner of medicine should be able to diagnose and to treat so common a disease as tuberculosis. Nothing is quite so mischievous in the campaign against tuberculosis as the notion that only a small group of physicians is competent for this task." With these wise words Dr. Myers states his guiding belief in the preface to his new work on tuberculosis, a book which is intended to provide students and practitioners with all essential facts and governing principles relating to the prevention, recognition and effective treatment of the disease.¹ The author's aim is an ambitious and noble one: "The volume is presented in the hope that it will stimulate among students and physicians a new interest in the study of tuberculosis; that it will aid many to become proficient diagnosticians; that it will suggest to them methods of treatment which may result in the alleviation of suffering and the extension of life; that it may inspire them to teach and to practise in their communities the true methods of prevention—to the saving of the lives of many now living and of thousands yet unborn from invalidness, poverty, and untimely death." The book is comprehensive, compressed, and yet convenient in its arrangement and general form and substance. It furnishes, in fact, a lucid, succinct, and practical summary of our present knowledge of all forms of tuberculous disease. Among the many books which have been written during recent years on tuberculosis Dr. Myers's volume deserves a foremost place. It is divided into three main divisions—General Considerations, Diagnosis and Classification, and Healing, Prognosis and Prevention. Within its aims and limitations the work is excellent. There are but few quotations from authorities and no references. Intended primarily for students and practitioners in the United States, the work is one which should appeal also to the same classes in this country, and it may be added that even tuberculosis officers and others who may claim to be specialists will find much in these pages which will stimulate and assist them in educational anti-tuberculosis efforts. The illustrations add to the value of the work, and of course there is an index.

¹ "Modern Aspects of the Diagnosis, Classification, and Treatment of Tuberculosis." By J. Arthur Myers, Associate Professor of Preventive Medicine, Medical and Graduate Schools, University of Minnesota; with an Introduction by D. A. Stewart, Associate Professor of Medicine, University of Manitoba. Pp. xii + 271, with 54 figs. London: Baillière, Tindall and Cox. 1928. Price 25s.

MANUALS FOR MEDICAL ADVISERS AND WORKS
OF REFERENCE.

Tuberculosis officers and all others whose chief duties necessitate a specialization of interests and study should make a point of always keeping on hand for systematic reading a work on general medicine, one in which diagnosis is given the foremost place. To such as approve this suggestion we commend Professor Rose's fine volume.¹ It has been prepared primarily for senior medical students and busy practitioners, and has found such favour that it is now in its fifth edition. Prominence is given to the essential features of clinical anatomy. The work is of special interest and value to those who have to deal with chest cases, for no less than 592 pages are devoted to the thorax, and of these 346 are taken up with the physical examination of the bronchopulmonary system. The chapters devoted to the examination of the chest by inspection, palpation, percussion, and auscultation are effectively illustrated; indeed, a special feature of the whole volume is the generous provision of instructive illustrations. Author and publishers alike are to be congratulated on the handsome appearance of this admirable work.

Every medical adviser who has to deal with chest cases should be acquainted with modern views on cardiology and present-day methods for carrying out the diagnosis and treatment of cardio-vascular disease. To all who desire to understand the essential differences between what may well be called the old and the new schools of cardiologists we commend a consideration of Dr. Heatherley's illuminating and instructive work, which is now in its second edition.² The author has enjoyed considerable experience in the study of heart cases through his service in connection with the work of the Ministry of Pensions. He is a disciple of the late Sir James Mackenzie, is well acquainted with the teaching of other eminent cardiologists, and after twenty-five years of general practice is able to bring an alert, judicial, enthusiastic, practical mind to bear on the discussion of present-day cardiological problems, and that without bias or prejudice. The work, while intended primarily for the general practitioner, is one which we would commend to the tuberculosis officer and all others who in any capacity have to deal with chest cases. The book opens with a discussion of the chief points of difference between the old and the new schools, and then follow a series of chapters dealing with such subjects as Abnormalities of the Heart Beat, Heart Failure, Angina Pectoris, Blood Pressure, Symptoms and Signs of Heart Disease, Progress and Treatment. The Appendix contains a reproduction of the form of instructions for the home treatment of functional heart disease, which is provided for the guidance of pensioners attending the Manchester Heart Clinic.

Drs. E. M. Brockbank and A. Ramsbottom, of Manchester, have just issued a second edition of their compact and instructive student's

¹ "Physical Diagnosis." By W. D. Rose, M.D., Associate Professor of Medicine in the University of Arkansas. Fifth edition, revised and enlarged. Pp. 819, with 310 illustrations and 3 coloured plates. London: Henry Kimpton, 263, High Holborn, W.C. 1. 1928. Price 42s.

² "Modern Methods in the Diagnosis and Treatment of Heart Disease." By Francis Heatherley, M.B., B.S.(Lond.), F.R.C.S., Superintendent, Heart Clinic, Manchester, and Cardiologist to the Ministry of Pensions. Pp. x+200. London: Baillière, Tindall and Cox. 1923. Price 8s. 6d. net.

manual on the examination of lung cases.¹ The methods of physical examination according to the classic method of inspection, palpation, percussion, and auscultation are admirably presented, and there is a concluding chapter on the physical signs of common pulmonary diseases. The work is based on extensive experience gained in the Manchester School of Medicine, and has been thoroughly revised and brought up to date. There are good reproductions of instructive X-ray films. Both teachers and students will welcome this new edition of a particularly serviceable manual.

Dr. C. Powell White has produced a highly original, suggestive, and helpful volume on what he terms the "principles of pathology."² It is a work which is to be commended to all teachers of pathology and to advanced students, and especially those reading for the higher examinations in medicine and pathology. Dr. White has spent the best days of his professional life as a research and laboratory worker, and has not been intimately associated with clinical medicine or teaching. He has therefore been able to bring a quiet, discriminating mind to the orderly elucidation of questions fundamentally connected with the biological aspects of general pathology. As the author explains in his preface, his book is not intended to serve as a textbook, but is to be taken as a supplement to existing systematic expositions of pathology. Much attention is devoted to nomenclature and classification, and opinions as to terminology are dogmatically expressed. The work is particularly valuable on account of the attention which is directed to relationships existing between various pathological processes. The volume is conveniently divided into well-arranged parts and sections. The first nine chapters are introductory, and then follow expositions dealing with the causation of disease, the processes of disease—consecutive, adaptive, and autonomous. There is a suggestive account of the causation of tuberculosis, in which it is insisted that tuberculosis is dependent on the action of the *Bacillus tuberculosis* on the tissues: "This implies two primary factors—namely, (1) the presence of an active bacillus, and (2) the susceptibility of the tissues." With regard to the latter, it is pointed out that it may be due to insanitary surroundings, to disease, to climate, to inborn tendencies, and so on. "However far we trace the causation of the disease, one factor, the bacillus, is always present, while the others are not individually essential but may be alternative. Similarly we find the bacillus present in the lesions which form part of the effect of its action—at least, until the bacillus is destroyed—and when this occurs the lesion ceases to be active." Dr. Powell's book is conspicuous by the absence of quotations and references; it is a fascinating expression of personal opinions and individual views. There is a particularly good index. The work is No. XVII. in the Medical Series of the Publications of the University of Manchester.

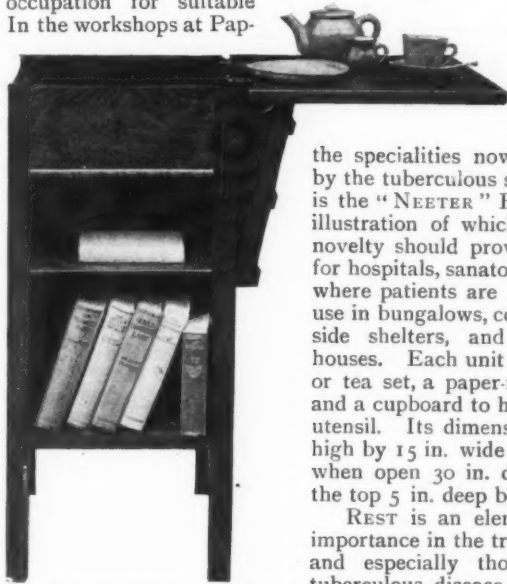
¹ "The Clinical Examination of the Lungs." By E. M. Brockbank, M.D., F.R.C.P., Hon. Consulting Physician, Royal Infirmary, Manchester, and Albert Ramsbottom, M.D., F.R.C.P., Professor of Clinical Medicine, University of Manchester. Second edition. Pp. viii + 112, with figures and plates. London: H. K. Lewis and Co., Ltd. 1928. Price 5s.

² "The Principles of Pathology." By Charles Powell White, M.D., F.R.C.S., Hon. Lecturer in Pathology and Director of the Helen Swindell's Laboratory in the University of Manchester. Pp. x + 279. Manchester: The University Press; London: Longmans, Green and Co., Ltd. 1927.

PREPARATIONS AND APPLIANCES.

HYGIENIC APPLIANCES AND THERAPEUTIC PREPARATIONS.

THE Papworth Tuberculosis Settlement, initiated by the vision and organizing skill of Dr. P. C. Varrier-Jones, is now known everywhere as one of the most successful of experiments for providing home and occupation for suitable tuberculous men. In the workshops at Pap-



THE "NEETER" BEDSIDE CABINET.

worth admirable training in skilled crafts is provided, and excellent work is being turned out. Among the specialities now being constructed by the tuberculous settlers at Papworth is the "NEETER" Bedside Cabinet,¹ an illustration of which is annexed. This novelty should prove popular not only for hospitals, sanatoria, and other places where patients are to be found, but for use in bungalows, country cottages, seaside shelters, and private dwelling-houses. Each unit contains a breakfast or tea set, a paper-rack and bookshelf, and a cupboard to hold a kettle or other utensil. Its dimensions are: 2 ft. 6 in. high by 15 in. wide by 15 in. deep, and when open 30 in. deep, with a well at the top 5 in. deep by 11½ in. by 11½ in.

REST is an element of the utmost importance in the treatment of the sick, and especially those suffering from tuberculous disease. Even for healthy children and vigorous adults undue fatigue may be prejudicial and prove a factor in the initiation of disease. In

connection with open-air spaces and gardens and public places in cities and towns, in hospital grounds, in sanatoria and open-air schools and their like, suitable sitting provision has now to be arranged for where weary and aged, stalwart and young, may profitably rest and gain the benefits which come from a wisely conducted leisure and a relief from physical activities. Realizing the importance of rest under congenial open-air conditions, there has developed during recent years an ever-increasing demand for comfortable, artistic, pleasing seats. These are now available in many and varied forms. Many are works of art and fine examples of craftsmanship in wood and metal. An

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admirable, inexpensive form of Garden Seat is being produced by T. E. Dingwall Limited.¹ It is well designed and strongly constructed of red deal, coated with a protecting preparation. The seat is low and wide, with comfortable back and arm rests at either end. The length is 4 ft., the width 2 ft., and the height at back 3 ft. 6 in. We have had personal experience of this excellent seat, which is one of the cheapest and best available for such resting in the open air as is essential for most tuberculous subjects.

"Where there's dirt there's danger" is the slogan of the Health and Cleanliness Council. While advisers in matters hygienic and medical are inculcating this truth among all classes of the commonwealth, it is well that they themselves should practise what they preach. The question of clothing and its protection from contaminations of all kinds is one which is only too apt to be overlooked or neglected in hospital, sanatorium, and dispensary work. It is of the utmost importance that in connection with tuberculosis work all classes of workers should be suitably and effectively clothed. The day has long gone by when any old coat was considered suitable for service when out-patients and the like had to be seen. Well-designed, protective, washable coats and jackets are now available for all who are engaged in active medical work. Messrs. Shoolbred are now providing excellent apparel for doctors and nurses.² For the use of surgeons, tuberculosis officers, and others, carefully designed coats have been constructed of stout, washable white drill. These garments are of the best workmanship, of good shape, and conveniently fitted with pockets and equipped with detachable buttons. Each coat can be easily disinfected and washed. It should also be noted that medical women are provided for. Special long coats in white drill, with pockets, detachable buttons, and also vent or whole back, as desired, can be supplied in different sizes. They can be obtained with either long or short sleeves, and in light or heavy drill. Where required they can be supplied in short lengths.

Insomnia is a condition which occurs in many states of physical and psychological derangement, and not only is distressing to the patient but often is a determining factor in the case. Many means for combating insomnia have been suggested. A novelty, designated the MORPHEUS SLUMBER MACHINE, has recently been brought to our notice.³ It is the invention of a doctor, and has already found favour with many patients. The appliance consists of an attractive little wooden cabinet containing a clockwork mechanism which when wound up produces a monotonous, humming, soothing sound somewhat resembling that due to running water. The sound lasts for about forty minutes, and during the last ten minutes gradually dies away.

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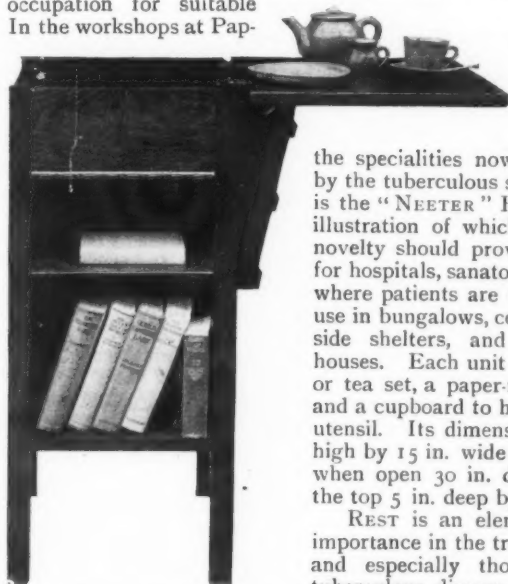
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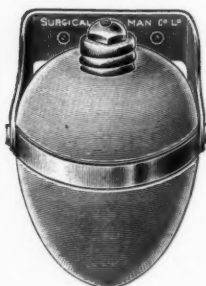
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popular adhesive possessing high sticking power, and is always ready for use. Patients, children, and indeed everyone, find it invaluable for repairs, and as an agent in many forms of constructive work. FIRMAS, or Heat Seccotine, is intended for the mending of china, delph, glass, or pottery which need washing frequently, and where the use of hot water is desirable. VALINE is an excellent Cream, conveniently put up in a collapsible metal tube, and ideal for cleaning and polishing boots and shoes, patent-leather goods, carriage bodies, and all kinds of oil-cloths. A companion preparation is DU BARRI'S FRENCH FURNITURE POLISH, for the easy and effective cleaning of furniture, japanned and papier mâché goods, etc. These preparations only require to be used to be appreciated, and should always be available.

The Motor Biscuit Tin supplied by Macfarlane, Lang and Co., Ltd., is a serviceable novelty which doctors and others who travel in motor-cars will be wise to provide themselves with.¹ This air-proof receptacle will also be appreciated by many delicate persons and patients who find a suitable, readily digestive, crisp, fresh biscuit a great help when travelling, or at night-time when sleepless. The above firm provides an admirable series of attractive nutrient biscuits which should find place in the new tin case.

The WATERMAN HOSPITAL SET is an ideal equipment for the doctor's consulting-room table, either for private professional work or for service in connection with hospital, sanatorium, or dispensary.² It will make an acceptable present for doctor or nurse. The set consists of a neat,



THE "SANILAVE"
LIQUID SOAP
CONTAINER.

well-constructed enamel-surfaced porcelain stand with tray and receptacles in which stand ready for use an "Ideal" Waterman Fountain Pen, a Waterman "Ever-Ready" Pencil with receptacle for leads, and a thermometer in case. Each of these have a smooth polished white surface and a pocket clip. This most practical novelty should be known and used by every medical adviser, as the set will greatly facilitate the conduct of professional work.

"SANILAVE" is an ingenious and effective liquid soap container which should be of service not only in hospitals and sanatoria, but in private houses, clubs, hotels, and indeed wherever persons take precautions to insure the prevention of infection by hygienically conducted washing. The chief features of this novelty are indicated in the annexed figure.³

The "CHO-KR"⁴ is a serviceable ash-tray which those responsible

¹ The new Motor Biscuit Tin supplied by Macfarlane, Lang and Co., Imperial Biscuit Works, Fulham, S W. 6, can be obtained from all high-class stores, price 2s., and particulars regarding biscuits for patients can be obtained on application to headquarters.

² The Waterman Hospital Set is supplied by L. G. Sloan, Ltd., The Pen Corner, Kingsway, W.C. 2. Price 72s. 6d. complete. A full description, with copy of "The Pen Book," will be sent to any doctor or nurse on application.

³ The "Sanilave" is supplied by the Surgical Manufacturing Co., Ltd., 83-85, Mortimer Street, W. 1. Price 8s. 6d. Registered No. 734,097. Various forms of "Sanilave" liquid soap are provided.

⁴ The "Cho-Kr" patent extinguishing ash-tray is manufactured by Ashted Potters Ltd., Ashted, Surrey.

for the maintenance of cleanliness and the diminution of risks from fire, whether in private habitations or in public institutions, will be glad to welcome. It is an artistic receptacle, made of pottery in different colours, so constructed that the smouldering cigarette can readily be extinguished. This novel tray only needs to be used to be appreciated.

TYPHOO TEA has for long been approved and used by members of the medical profession. In order to make their speciality better known to doctors the manufacturers are now supplying to medical advisers a series of serviceable novelties likely to be of daily use in the conduct of a busy practice. These are provided at merely nominal rates. Among the practical appliances are the safety sterilizer lamp, the medical electric torch, the metal calendar and paper-weight, pocket pens and pencils and thermometers. We specially commend these helpful appliances to the notice of tuberculosis officers and superintendents of tuberculosis hospitals and sanatoria.¹

SANSILLA, a mentholated solution of aluminium and calcium chlorates, is an excellent dentifrice, mouth wash, and gargle, for use in cases where such morbid states as pyorrhoea, dental caries, and catarrhal and septic conditions of the throat threaten the general health.² It will be found of service in dealing with many tuberculous patients.

RAWLPLUG LIQUID PORCELAIN is a new preparation for local application by means of a brush to metal taps, baths, bathroom fixtures, coat-hooks, and other metal fittings liable to rust and tarnish.³ It provides a clean, smooth, white, durable surface which can be easily kept presentable and hygienic, and will conserve time and energy not only in public institutions, but in the ordinary home.

Honey is a natural food product which all healthy children and grown-ups should enjoy. It is also a nutrient of high value in many wasting disorders, and in cases of tuberculosis it is oftentimes of considerable service. As a source of energy, and taken with porridge or dry foods it is excellent for breakfast. A reliable form of honey is that now available as New Zealand "IMPERIAL BEE" HONEY.⁴ It is rich in dextrose and laevulose, and contains vitamin B. In colour, flavour, consistency, and palatability this honey is standardized, and is of excellent quality. It is just the dietetic preparation which will find favour in hospitals and sanatoria, and is to be commended to the notice of doctors and nurses, and employed in the treatment of tuberculous and tuberculously disposed cases.

DIMOL is proving a valuable agent in dealing with toxæmic conditions of intestinal origin.⁵ The pathological significance of intestinal toxæmias is now being better understood, and many imperfectly understood morbid conditions are generally recognized as due to intestinal infections and toxic absorption. For dealing with these Dimol is of

¹ Particulars regarding "Typhoo" Tea and the medical novelties above referred to can be obtained on application to Sumner's Typhoo Tea Ltd., Castle Street, Birmingham, who will be pleased to send a sample of their tea on application.

² Sansilla is prepared by the Hausmann Company, St. Gall, Switzerland, and can be obtained in this country from Wilcox, Jozeau and Co. (Foreign Chemists), Ltd., 15, Great St. Andrew Street, W.C. 2.

³ Rawlplug Liquid Porcelain is manufactured by the Rawlplug Co., Ltd., Rawlplug House, Cromwell Road, S.W. 7.

⁴ A. J. Mills and Co., Ltd., 14, Tooley Street, S.E. 1, are the sole European agents for the New Zealand "Imperial Bee" Honey.

⁵ Particulars regarding Dimol can be obtained on application to Dimol Laboratories, Ltd., 40, Ludgate Hill, E.C. 4.

much service. Many consumptive and other tuberculous cases can be greatly assisted by attention to the correction of morbid processes in connection with the gastro-intestinal tract. Dimol has been found to be a valuable therapeutic agent in dealing with many such cases. Where there is intestinal stagnation and putrefaction and the system is being poisoned by toxic products and invaded by organisms from the intestines, Dimol should be tried.

SANITAS Fluid is a long-established and justly popular antiseptic, disinfectant, and deodorant, which can safely and effectively be used anywhere and for almost all conditions calling for the use of a safe, reliable and pleasant agent for combating troubles of microbic origin.¹ As a hygienic and therapeutic agent it should have a place in all hospitals, sanatoria, nursing homes and dwelling-houses. It can be used for many purposes: as a general agent against infection and for cleansing patients' rooms; for personal hygiene and toilet use; and as an antiseptic gargle and wash for mouth, nose, throat, teeth, etc. It is a useful preparation to employ in many cases where foul breath, offensive discharges or malodorous secretions are objectionable features. For use in connection with the collection of tuberculous sputum Sanitas is of service. Sanitas Disinfecting Powder is also valuable in maintaining sanitary conditions both in public institutions and private houses.

HISTOSAN SYRUP is a reliable and palatable non-irritating guaiacol-albumin preparation which has proved of service in pulmonary tuberculosis and other affections of the bronchi and lungs. Creosote has long been approved as a valuable agent in dealing with various disorders of the respiratory tract, and in the form of "Histosan"² the advantages of creosote are obtained without its drawbacks.

ODOL is a much approved antiseptic and deodorant preparation for the hygienic care of the mouth, the cleansing of the teeth, and the protection of the gums. It makes an admirable mouth-wash, and is extensively employed as a dentifrice. It is available in liquid form, being put up in ingeniously shaped flasks, and can also be obtained as a Tooth Paste. The ODOL TOOTH BRUSH is one which is to be commended, for the handle is so shaped as to ensure a firm grip; the bristles are of excellent quality and have been sterilized, and moreover they have a convex and concave form for fitting into the curve of the teeth and gums; and the brush is supplied in a closed packet free from dust or the possibility of other contamination.³

¹ Particulars regarding Sanitas Fluid, Sanitas Powder, and other Sanitas preparations can be obtained on application to The Sanitas Company, Limehouse, E. 14.

² Particulars and specimens of Histosan ("Hommel Brand") can be obtained from Hommel's Hæmatogen and Drug Company, 121, Norwood Road, S.E. 24.

³ Particulars regarding the Odol Specialities can be obtained from Cranbux Limited, 1, Westwick Street, Norwich, Norfolk.

THE OUTLOOK.

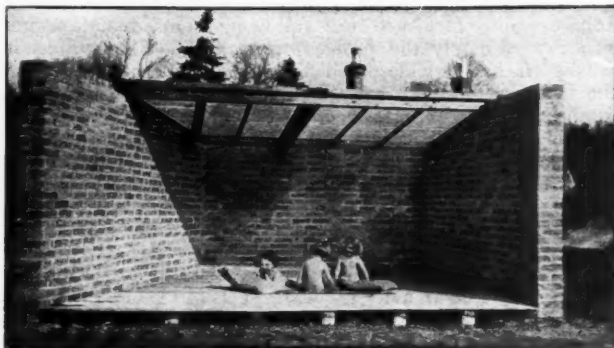
THE NATIONAL TUBERCULOSIS SCHEME.

SIR ROBERT PHILIP, Professor of Tuberculosis in the University of Edinburgh and President of the British Medical Association, has recently delivered an important address on the evolution of our National Tuberculosis Scheme and the results which have been obtained.¹ In reviewing the past and looking forward to the future, Sir Robert Philip furnished the following concise and suggestive statement: "Gradually the problem extended. Tuberculous infection was seen to be widespread throughout civilized communities. For the most part it was contracted in childhood. Varying degree of resistance to the infection was offered by different individuals. The resultant of the infection depended on the amount of the infecting dose and its repetition, and on the resistance offered by the individual. The degree of resistance was influenced greatly by environment—interpreting that term in a wide sense—and to some extent by racial quality. In consequence of this the outward manifestations of the infection differed much in character and degree. All this meant a revision of the medical outlook. Attention had to be directed: (1) Towards the detection of the infection at the earliest possible moment; (2) towards detubercularization of the tubercularized individual as speedily and thoroughly as might be; (3) towards the elimination, or at least progressive lessening, of environmental conditions which fostered the advance of infection by lowering individual resistance; (4) towards securing sufficient duration of efficient treatment in presence of pronounced disease; (5) towards the limitation of the spread of infection from advanced cases. In order to meet the different issues there evolved progressively the several elements in what is now described as the tuberculosis scheme, generally applied throughout the land. In so far as it has really met the issues and been efficiently handled the machinery has proved serviceable. If experience has shown that the quality and temper of the machine, as erected in different areas, have not always been equal, nor the standard of the personnel in charge, that is only what was to be expected. Time is improving both the machinery and the personnel. The purposes and hang of its different parts are becoming better understood; the training of the officers in charge is being progressively adapted to the needs. Thus, at the University of Edinburgh the undergraduate in medicine has a course of thirty meetings on tuberculosis. The course is practical and compulsory, and tuberculosis is included among the subjects for the final examination in medicine. Candidates for the Diploma in Public Health attend a further course of twenty meetings, and the subject forms part of the examination for the diploma. The Departmental Committee on Tuberculosis recognized and enforced the need for special training and experience in dealing with the disease. It seems singularly inopportune that, just when the machinery is getting into motion throughout the country, the proposal has been made to replace the specialized staff by officers in the public health service who happen to have time, but may have little experience of, or interest in, the complex problems. The issues involved are critical. It is not good policy to swap horses in crossing the ford."

¹ "The Causes of the Decline in Tuberculosis Mortality," *British Medical Journal*, April 28, 1928, p. 701.

A SIMPLE SUN-BATH.

Heliotherapy, or treatment by natural sunlight, can only be carried on in this country with difficulty and for a limited portion of the year. It is therefore desirable to avail ourselves of all possibilities, and to conserve such sunlight as is available. In connection with the Brackenhill Open-air Home School for non-tuberculous children at Hartfield, near Tunbridge Wells, Sussex, conducted by a board of directors, of



BRACKENHILL OPEN-AIR HOME SCHOOL SUN-BATH.

which Mrs. R. W. Ensor is chairman, a simple economic, effective sun-bath has been constructed. As many will like to construct a similar sun-trap we are glad to be able to give an illustration. This pictorial representation will be of service to other schools and various sanatoria and open-air institutions for children in indicating how readily a really desirable sun-bath may be constructed at comparatively small cost.

NOTES AND RECORDS.

The Ministry of Health, in answer to enquiries made in the House of Commons, has stated that the total expenditure in England and Wales on the carrying out of the approved schemes for the treatment of tuberculosis during each of the last four years for which figures are at present available, excluding capital expenditure, was as follows (year ended March 31) :

1924	...	...	£2,884,062	|	1926	...	...	£3,157,694
1925	...	...	£3,034,600	|	1927	...	...	£3,294,991

The Ministry of Health has recently issued Circular 900, dealing with the treatment of ex-service men suffering from tuberculosis.

The Minister of Health has recently given in the House of Commons some interesting statistical data relating to tuberculosis in England and Wales. The total number of notified cases which remained on the registers of local authorities on December 31, 1927, was 363,187. The number of institutions approved for the residential treatment of tuberculosis under the schemes of local authorities (excluding general

hospitals) is 349, of which 215 have been provided by local authorities and 134 by voluntary bodies. These are all maintained wholly or partially out of public funds. During 1926 the number of persons who received residential treatment for tuberculosis under the schemes of local authorities was 63,680, and the average duration of treatment was approximately 150 days.

The National Association for the Prevention of Tuberculosis will hold its fourteenth Annual Conference of the Association in the Great Hall of the British Medical Association House, Tavistock Square, W.C. 1, on Monday and Tuesday, October 15 and 16. The Conference is being held later than usual in the year in order to meet the wishes of the Council of the Canadian Tuberculosis Association, who are sending a number of Canadian tuberculosis officers to Europe to study tuberculosis work. The subjects chosen for discussion are: (1) "The Occurrence of Tuberculosis among Primitive Peoples," and (2) "The Principles Underlying a Scheme of Anti-Tuberculosis Measures in any Country." The Conference is open to all persons interested in tuberculosis on payment of the fee of one guinea, either as delegates or as private members of the Conference. This sum includes payment for the supply of a copy of the report of the proceedings. Further particulars may be obtained on application to the Secretary, 1, Gordon Square, W.C. 1.

The report of the Wingfield Orthopædic Hospital for the Cure of Cripples, Headington, Oxford, is a worthy record of fine service carried out at headquarters and associated orthopædic departments and clinics. A map on the cover shows the area covered by the Wingfield organization.

In connection with the forthcoming Ninety-sixth Annual Meeting of the British Medical Association at Cardiff there is to be a Tuberculosis section, presided over by Dr. H. Morriston Davies, and with meetings on July 25 and 26, when discussions will be held on "The Relation between Trauma and Tuberculosis, especially from the Point of View of Compensation and Accident Insurance"; "After-Effects of Surgical Procedure on Cases of Pulmonary Tuberculosis"; and "Tuberculosis as seen by the General Practitioner." Papers will be read and demonstrations given.

A course in dermatology and venereology will be held at the clinic for cutaneous and syphilitic diseases at Strasbourg, September 17 to November 3, under the direction of Prof. L. M. Pautrier. Those who attend will be given the opportunity of personally applying the various methods of treatment, and will have free access to the clinic outside the hours of the lectures. Applications should be sent to Prof. Pautrier, 2, Quai St. Nicolas, Strasbourg, who will send particulars of accommodation available in the city.

Health Week is to be held October 7-13. The object of Health Week is to focus public attention for one week in the year on matters of health, and to arouse that sense of personal responsibility for health, without which all public work, whether by the Government or Local Authorities, must fall far short of its aims. It is suggested that the dominant idea should be "Self-Help in Health," and the consideration of what each individual can do for himself and his neighbour in securing a healthy life. Further particulars may be obtained on application to the Secretary, the Royal Sanitary Institute, 90, Buckingham Palace Road, S.W. 1.

The fifty-seventh annual meeting of the American Public Health Association will be held in Chicago, Ill., October 15-19, with headquarters at Hotel Stevens. The American Child Health Association and the American Social Hygiene Association are co-operating. Members of the British health services who will be in the United States in October should apply for the full programme to the A.P.H.A., 370, Seventh Avenue, New York.

Medical practitioners desiring to visit Paris hospitals should know that courses of post-graduate lectures, delivered in English, will be given in October by Drs. Sergent, Clerc, Armand-Delille, Weill-Halle, Gosset, Morax, and Lemaitre. Full particulars may be obtained on application to the Association pour le Développement des Relations Médicales, Salle Bécлар, Faculté de Médecine, 12, Rue de l'Ecole de Médecine, Paris.

The Joint Tuberculosis Council is rendering valuable service in providing for post-graduate instruction regarding tuberculosis. A course was conducted in June at Lord Mayor Treloar Cripples' Hospital and College, Alton, Hampshire, under the direction of Sir Henry Gauvain. From July 2 to 7 a course was held at Cambridge, arranged by Dr. P. C. Varrier-Jones. Particulars regarding the future work of the Joint Tuberculosis Council may be obtained on application to the Hon. Secretary, Post-Graduate Courses, the Larches, Farnham Royal, Bucks.

Sir Robert Philip, President of the British Medical Association, has been awarded the Trudeau Medal, which is given annually to the individual who has made the most meritorious contribution to the knowledge of the cause, prevention, and treatment of tuberculosis.

"The Sunlight and Health" number of *The Times*, issued May 22, is a forty-page illustrated summary of up-to-date knowledge and achievement regarding heliotherapy, actinotherapy, and allied measures for the maintenance of health and the cure of tuberculosis and other morbid conditions. The pictures alone make this publication one which no tuberculosis officer can afford to neglect.

"The House that Trudeau Built" is an elaborately illustrated souvenir of the Trudeau Sanatorium of Essex County of the State of New York, and admirably sets forth the wonderful work initiated by the late Dr. Edward Livingston Trudeau in 1884.

"Every Day Prayers," published by the Women's Printing Society, Ltd., Brick Street, Piccadilly, W. 1 (price 6d.), is a sixty-page booklet of prayers for use in the East Anglian Sanatorium, Nayland, Suffolk.

Dr. Donald Hall has issued, through H. K. Lewis and Co., Ltd., 28, Gower Place, W.C. 1, a thirty-one page suggestive brochure entitled "Help obtained from Electro-cardiography."

Campers will find much practical information in the guide-book issued by J. Langdon and Sons. It contains particulars and illustrations of all classes of tents, with data relating to camping, sites, equipment, and the like.¹

¹ "The Camper's Guide and Year Book" (pp. 60) is supplied free on application to J. Langdon and Sons, Ltd., Tent and Camp Equipment Manufacturers, Duke Street, Liverpool.